CRF-1

US Model
AEP Model
E Model

REVISED
Discard your CRF-1
Service Manual and Supplement
No.1 previously issued.

Canadian Model

PLL SYNTHESIZED RECEIVER

SPECIFICATIONS

Circuit system	Dual conversion superheterodyne
Semiconductors	21 ICs, 22 FETs, 68 transistors, 100 diodes (including 12 LEDs)
Frequency range	AM 10 kHz-30 MHz (30,000-10 m)
Operating modes	AM (WIDE, NARROW), USB, LSB, CW
Intermediate frequency	1st: 55.845 MHz 2nd: 455 kHz

Sensitivity

Frequency	AM (NARROW)	SSB
10 kHz-50 kHz	30 dB (30 μV)	20 dB (10 μV)
50 kHz-30 MHz	0 dB (1 μV)	-10 dB (0.3 μV)

Selectivity

Mode / Band width	AM		SSB
	WIDE	NARROW	
-6 dB	More than 10 kHz	More than 4.4 kHz	More than 2.0 kHz
-60 dB	Less than 16 kHz	Less than 8.0 kHz	Less than 3.4 kHz

Image rejection	1st: 100 dB at 10 MHz 2nd: 90 dB at 10 MHz
IF rejection	90 dB at 10 MHz
Antennas	Telescopic antenna (150 kHz-30 MHz) External antenna terminals (10 kHz-30 MHz) 50-75 ohms, BNC connector and 2-p terminal
Speaker	Approx. 10 cm (4 inches) dia.
Power output	1.2 W (at 10% harmonic distortion) at dc operation
Inputs	Timer input jack (minijack) Mute input jack (minijack)

— Continued on page 2 —

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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LES COMPOSANTS IDENTIFIÉS PAR UNE TRAME ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

MICROFILM

SONY®

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Inputs	Timer input jack (minijack) Mute input jack (minijack)

— Continued on page 2 —

SONY®
SERVICE MANUAL

MICROFILM

Outputs	Recording output jack (minijack) output level 150 mV (−14 dB) output impedance 600 ohms Headphones jack (stereo binaural type jack) for 8-ohm impedance stereo or monaural headphones External speaker jack (minijack) Accepts 4 - 16 ohm speaker.
Power requirements	Receiver section: 12 V dc, eight batteries IEC designation R20 (size D) 110, 120, 220 or 240V ac with supplied Sony AC Power Adaptor listed on page 19. 12 V car battery with Sony Car Battery Cord DCC-120 (optional) 24 V car battery with Sony Car Battery Cord DCC-240 (optional) Memory circuit: 3 V dc, two batteries IEC designation R6 (size AA)
Battery life	Receiver section: Approx. 3 total hours of use with Sony Super Batteries SUM-1S (at normal listening level) Approx. 6 total hours with Eveready Heavy Duty Batteries No. 1250 Memory circuit: Approx. 1 year with Sony Super Batteries SUM-3S or Eveready Heavy Duty Batteries No. 1215
Dimensions	Approx. 260×100×330 mm (w/h/d) (10⅜×4×13⅛ inches) incl. projecting parts and controls, without carrying handle
Weight	Approx. 6.6 kg (14 lib 9 oz) incl. batteries or ac power adaptor

SECTION 1
OUTLINE

1-1. CIRCUIT DESCRIPTION

This receiver is capable of receiving broadcast from 10 kHz to 30 MHz with one TUNING knob. This set is equipped with one-chip ICs to carry out band switching and PLL synthesizing, and to provide digital displays. A description of its circuit, divided into the signal circuit and synthesizer circuit, follows. The circuit will be described in signal section and synthesizer sections.

- **Signal Circuit**

This receiver has a built-in rod antenna. A preselector is also provided to enable tuning and matching to the rod antenna or external antenna.

When S503 (antenna selector switch) is set to the ROD ANT position, the signal from the rod antenna is applied directly to the preselector without passing the bandpass filter.

As the input impedance of the bandpass filter is matched to the impedance of an external antenna [50 to 75 ohms], the signal level will drop when the rod antenna is connected, so the signal is supplied directly to the preselector without going through the bandpass filter.

When the S503 switch is set to any other position, the signal is supplied to the receiver passing through the bandpass filter.

Any unwanted signal components of the signals from the antenna are eliminated by filters covering the spectrum in octaves, and supplied to a diode attenuator formed in π configuration.

The diode attenuator is a circuit provided for the elimination of cross modulation interference; since the signal that functions this attenuator circuit is derived from the output of the RF amplifier, its interference eliminating characteristics are better compared to conventional circuitry employing only an IF AGC circuit.

The signal that has passed through the RF amplifier is supplied to the first mixer.

The first mixer is a balanced mixer type circuit using a dual FET and here the first IF [55.845 MHz] is generated.

The local oscillator supplying the first mixer is VCO_1. Stable oscillation is provided by VCO_1 by means of a PLL synthesizer.

A crystal filter is used in the first IF amplifier circuit to prevent cross modulation. Also independent AM WIDE, AM NARROW, and SSB ceramic filters are provided in the second IF [455 kHz] amplifier circuit, to improve SSB selectivity and AM NARROW clarity.

Ignition noise and other similar forms of interference are eliminated by means of a noise blanker circuit.

The signal from the second IF amplifier is supplied to the detector circuit, and then to the audio frequency and power amplifiers.

SSB signals are mixed with a BFO signal by means of a balanced modulation circuit to demodulate the SSB signals, and then the demodulated signal is passed through a filter circuit and on to the audio frequency amplifier.

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Supplement
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Model

:IVER

SSB
IB (10μV)
IB (0.3μV)

SSB
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Ignition noise and other similar forms of interference are eliminated by means of a noise blanker circuit.

The signal from the second IF amplifier is supplied to the detector circuit, and then to the audio frequency and power amplifiers.

SSB signals are mixed with a BFO signal by means of a balanced modulation circuit to demodulate the SSB signals, and then the demodulated signal is passed through a filter circuit and on to the audio frequency amplifier.

• RF AGC

Figure 1 shows the RF AGC circuit.

Q120 and Q121 is a differential amplifier and when Q121 is ON, Q120 is OFF. If no strong signal is applied, then Q121 will be ON and Q120 will be OFF, while a positive direction bias is supplied to D111, turning it ON.

Therefore, the signal is supplied to the RF amplifier via C162, D111.

If signal is strong:

The signal amplified by the RF amplifier will be supplied to Q119 and amplified, and then further amplified by IC101.

The output of IC101 is detected by D109 and D110. The detected output is supplied to the base of Q120, and Q120 turns ON.

When Q120 turns on, Q121 turns OFF. Therefore, a positive direction bias is applied to D112 and D113, turning them on.

Therefore, the level of the signal is dropped by D112 and C163, to prevent cross modulation when there is a powerful signal input.

When Q120 turns ON, voltage is applied to the base of Q122 and Q122 turns ON. Gate of each RF amplifiers is connected to the collector of Q122. By changing the gate voltage of each of the RF amplifiers by Q122, RF amplifiers are under AGC (Automatic Gain Control).

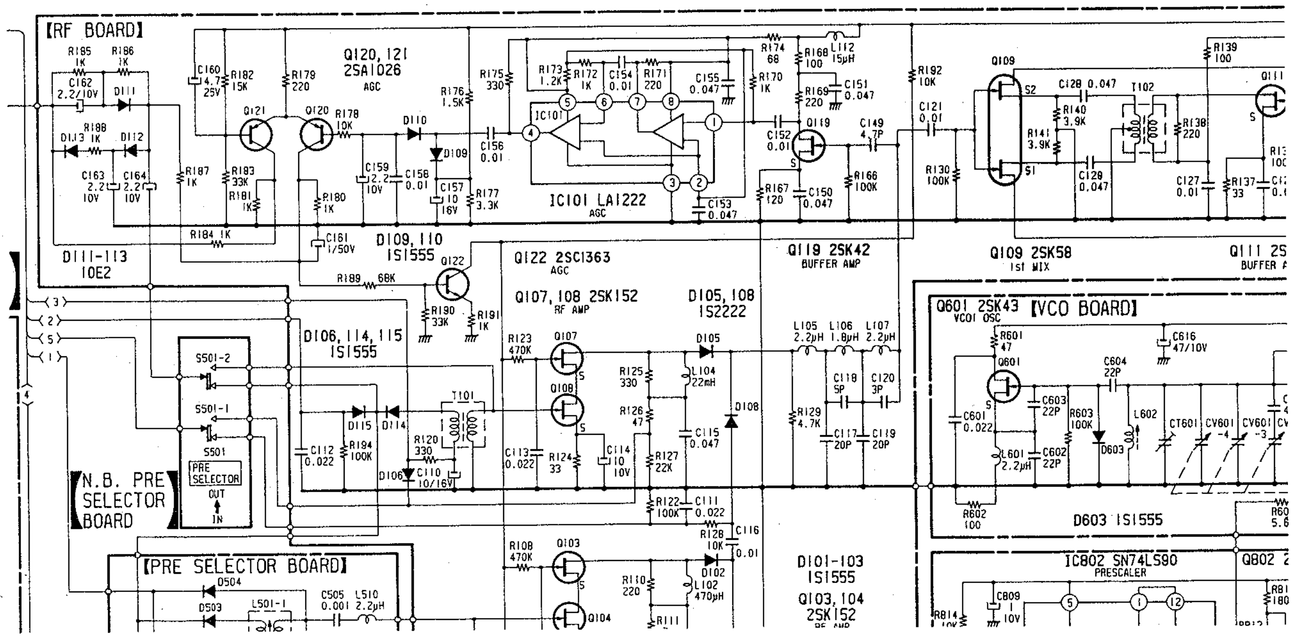

Fig. 1

- **Noise Blanker Circuit (Look together with the schematic diagram.)**

The noise blanker circuit is a circuit that extracts and eliminates large pulse-type noises that are present in the signal components. This is performed in the following manner.

The signal from the second IF passes through CF101 and is supplied to IC201. It also passes through CF102 and is supplied to the noise blanker circuit.

The signal that has passed through CF102 is amplified by Q201 – Q204. The amplified signal is then supplied to Q206 and T201.

The signal supplied to T201 is detected by Q205. The detected signal is on the one hand supplied to Q201 – Q203 as the AGC signal, and, at the same time, to the emitter of Q206.

Q206 is a pnp transistor, and so it turns ON when the base potential drops to a value 0.6 volts lower than the emitter potential.

Suppose that signal Ⓐ has come into Q204. This signal is amplified and supplied to the base of Q206.

Meanwhile, the signal that has passed through T201 is detected by Q205, and supplied to the emitter of Q206.

If there is any pulse-type noise present in the signal at this time, the pulse-type noise will be grounded by C218.

However, the voice signal components will be supplied as they are to the emitter of Q206.

At this time, insofar as the voice signal components are concerned, the negative components that are being supplied to the base and the signal that is being supplied to the emitter are in phase with each other. Therefore, Q206 turns ON only when there is pulse-type noise present.

When Q206 turns ON, Q207 also turns ON; the gate of IC201 closes, so only the pulse-type noise components are extracted and eliminated.

An AGC signal is supplied to Q201 – Q203 to prevent Q206 from turning on when a strong signal is supplied.

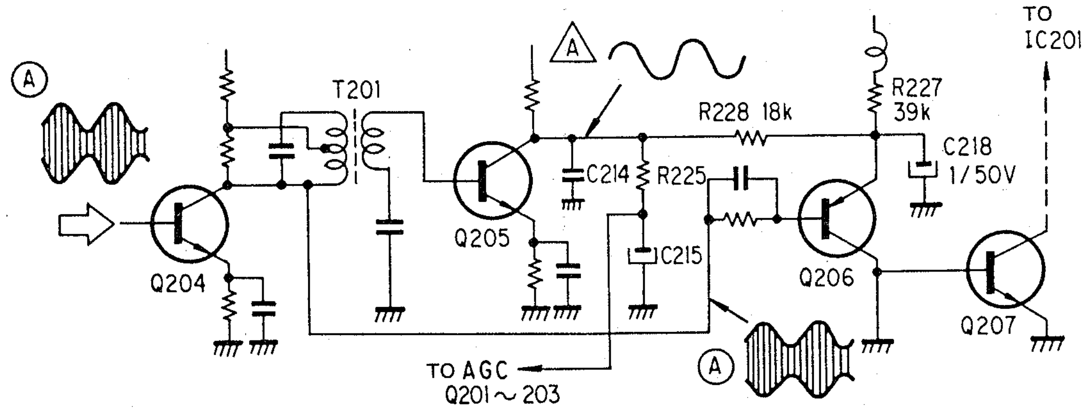
Ⓐ
T201
Q204
Q205
A
R228 18k
R227
39k
C214
R225
C215
C218
1/50V
Q206
Q207
TO
IC201
TO AGC
Q201～203
Ⓐ

Fig. 2

- **Synthesizer**

The synthesizer circuit controls the local oscillator circuitry. It is divided into a PLL circuit comprising IC803, a first oscillator, a second oscillator, a VCO, a VFO, and a digital display circuit comprising IC803.

Figure 3 shows a block diagram of this circuit.

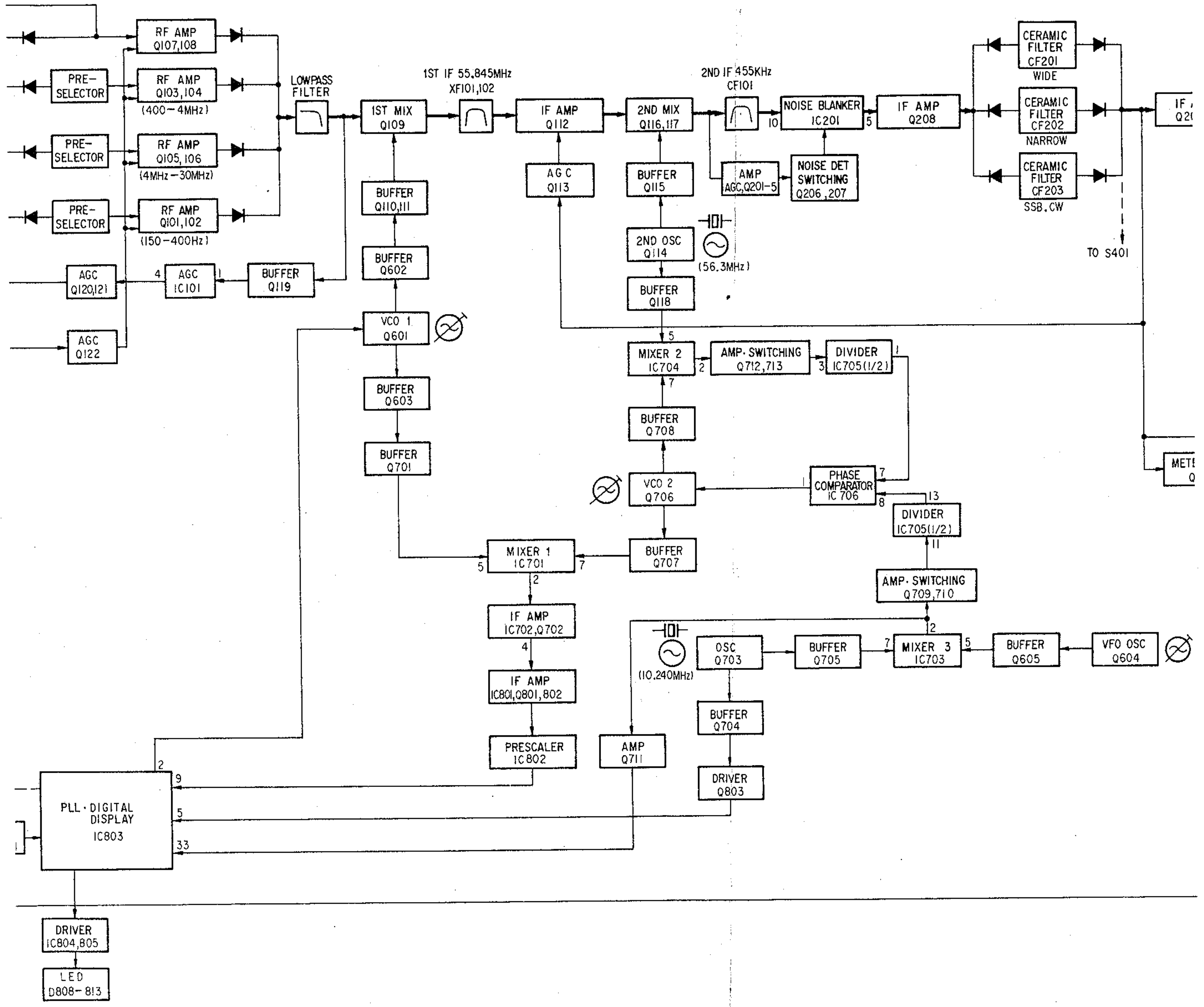
RF AMP
Q107,108
PRE-
SELECTOR
RF AMP
Q103,104
(400－4MHz)
PRE-
SELECTOR
RF AMP
Q105,106
(4MHz－30MHz)
PRE-
SELECTOR
RF AMP
Q101,102
(150－400Hz)
AGC
Q120,121
4
AGC
IC101
1
BUFFER
Q119
AGC
Q122
LOWPASS
FILTER
1ST MIX
Q109
1ST IF 55.845MHz
XF101,102
IF AMP
Q112
AG C
Q113
BUFFER
Q110,111
BUFFER
Q602
VCO 1
Q601
BUFFER
Q603
BUFFER
Q701
2ND MIX
Q116,117
2ND IF 455KHz
CF101
10
NOISE BLANKER
IC201
5
IF AMP
Q208
AMP
AGC,Q201-5
NOISE DET
SWITCHING
Q206,207
BUFFER
Q115
2ND OSC
Q114
(56.3MHz)
BUFFER
Q118
CERAMIC
FILTER
CF201
WIDE
CERAMIC
FILTER
CF202
NARROW
CERAMIC
FILTER
CF203
SSB.CW
TO S401
5
MIXER 2
IC704
2
AMP·SWITCHING
Q712,713
3
DIVIDER
IC705(1/2)
1
7
BUFFER
Q708
VCO 2
Q706
1
PHASE
COMPARATOR
IC 706
7
8
13
DIVIDER
IC705(1/2)
11
AMP·SWITCHING
Q709,710
BUFFER
Q707
7
MIXER 1
IC701
5
2
IF AMP
IC702,Q702
4
IF AMP
IC801,Q801,802
PRESCALER
IC802
AMP
Q711
(10.240MHz)
OSC
Q703
BUFFER
Q705
7
MIXER 3
IC703
2
5
BUFFER
Q605
VFO OSC
Q604
BUFFER
Q704
DRIVER
Q803
PLL·DIGITAL
DISPLAY
IC803
2
9
5
33
DRIVER
IC804,805
LED
D808-813

Fig. 3

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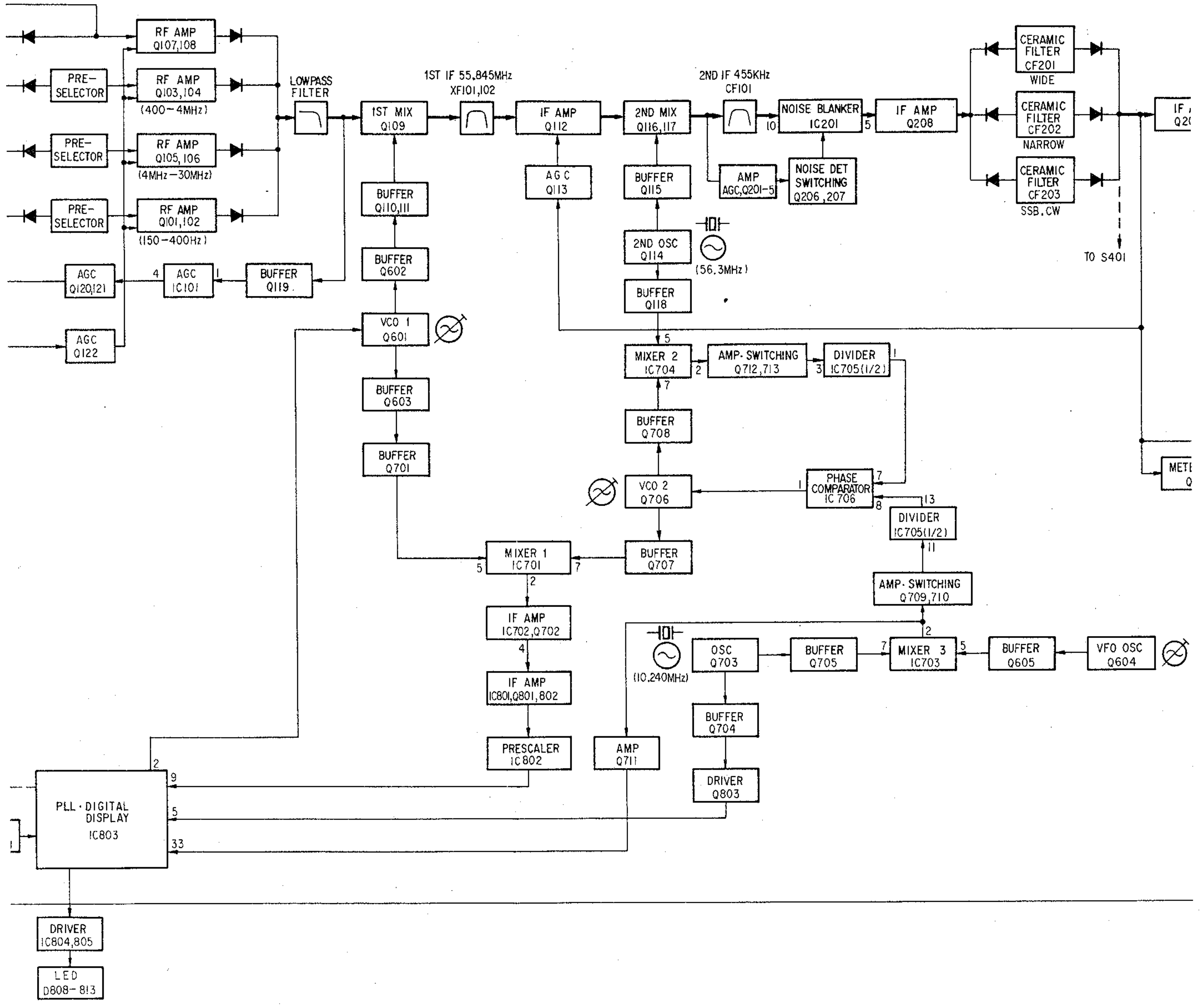

RF AMP Q107,108
PRE-SELECTOR
RF AMP Q103,104
(400−4MHz)
PRE-SELECTOR
RF AMP Q105,106
(4MHz−30MHz)
PRE-SELECTOR
RF AMP Q101,102
(150−400Hz)
AGC Q120,121
4
AGC IC101
1
BUFFER Q119
AGC Q122
LOWPASS FILTER
1ST MIX Q109
1ST IF 55.845MHz XF101,102
IF AMP Q112
AGC Q113
BUFFER Q110,111
BUFFER Q602
VCO 1 Q601
BUFFER Q603
BUFFER Q701
2ND MIX Q116,117
2ND IF 455KHz CF101
10
NOISE BLANKER IC201
5
IF AMP Q208
AMP AGC,Q201-5
NOISE DET SWITCHING Q206,207
BUFFER Q115
2ND OSC Q114
(56.3MHz)
BUFFER Q118
CERAMIC FILTER CF201
WIDE
CERAMIC FILTER CF202
NARROW
CERAMIC FILTER CF203
SSB.CW
TO S401
IF
Q2
METE
Q
5
MIXER 2 IC704
2
AMP·SWITCHING Q712,713
3
DIVIDER IC705(1/2)
1
7
BUFFER Q708
VCO 2 Q706
1
PHASE COMPARATOR IC 706
7
8
13
DIVIDER IC705(1/2)
11
AMP·SWITCHING Q709,710
BUFFER Q707
5
MIXER 1 IC701
7
2
IF AMP IC702,Q702
4
IF AMP IC801,Q801,802
PRESCALER IC802
AMP Q711
(10.240MHz)
OSC Q703
BUFFER Q704
DRIVER Q803
BUFFER Q705
7
MIXER 3 IC703
2
5
BUFFER Q605
VFO OSC Q604
PLL·DIGITAL DISPLAY IC803
2
9
5
33
DRIVER IC804,805
LED D808-813

Fig. 3

- **PLL Circuit (See Fig. 3.)**

This receiver is capable of receiving broadcasts from 10 kHz to 30 MHz with a single TUNING knob. In order to provide an accurate digital display in 100 Hz, the tuning knob can be set to either of two positions, pulled or pushed in.

When the TUNING knob is pulled, the PLL circuit is not locked, and it is in a free running state.

When the TUNING knob is pushed in, the PLL circuit is locked, and accurate reception down to increments of 100 Hz is possible.

When the TUNING knob is turned while pulled the frequency of VCO_1 [Q601] changes. When the TUNING knob is turned while pushed in, the frequency of VFO changes. The frequencies of VCO_1 and VFO do not change simultaneously.

The following description is on the PLL circuit.

When the TUNING knob is pushed in, the frequency of the VFO will change when the knob is turned. The VFO carries out its oscillating function using a lithium tantalum element, and is capable of providing high stability in its oscillations.

The signal from the VFO and the signal from the Q703 crystal oscillator circuit are mixed by IC703, and then, after passing through a frequency divider circuit [IC705], are supplied to a phase comparator [IC706].

Meanwhile, the oscillator signals from VCO_2 [Q706] and the second local oscillator [Q114] are mixed by IC704, and then, after passing through a frequency divider circuit [IC705], are supplied to one of the inputs of the phase comparator [IC706].

Because the second oscillator also uses a crystal oscillator circuit, it too provides high stability oscillations. The signals that go through a comparison process in the phase comparator are converted into a dc potential and supplied to the variable capacitance diode of VCO_2 to maintain the oscillation frequency of VCO_2 at a constant level.

The stabilized signal from VCO_2 and the signal of VCO_1 are mixed by IC701, frequency-divided by the prescaler [IC802], and then supplied to terminal ⑨ of IC803. They are again frequency-divided in IC803, and compared with reference signal.

The signal generated in the Q703 crystal oscillator circuit is frequency-divided in IC803 and is formed into reference signal.

These two signals are subjected to a comparison process, and the difference between them is converted into a dc potential which is supplied to the variable capacitance diode of VCO_1 to maintain the frequency of VCO_1 at a constant level.

Thus, accurate reception corresponding to the frequency of the input signals is provided.

- **Digital Display Circuit (See Fig. 4.)**

This receiver displays the accurate frequency of the signal being received on a digital display. This display is also controlled by IC803. A description of this circuit follows.

When the TUNING knob is turned while pulled the frequency display provides readouts in increments of only down to 1 kHz.

When the TUNING control knob is turned while pushed in, the frequency display provides readouts in increments of down to 100 Hz.

This is achieved automatically within IC803, by changing the level at terminal ㊴ (CS) of IC803 either to "H" or "L".

Figure 4 shows the schematic diagram of this section.

IC809-4 in Fig. 4 is an exclusive OR type IC. It is an IC that produces "L" level outputs when the inputs are the same.

When the TUNING knob is pulled, both inputs are "H" level and the output drops to "L" level. The output of IC809-4 is supplied to one of the inputs of IC808-3. As IC808-3 is a NAND, the circuit is controlled within the IC so that if one of the inputs is "L" level, the outputs will rise to "H" level. Then the output of IC808-3 in turn becomes "H" level, terminal ㊴ of IC803 becomes "H" level, and 100 Hz increment displays will not be provided.

When the TUNING control is pushed in, terminal ⑦ of IC803 drops to "L" level and turns Q808 "ON". When Q808 turns ON, the emitter drops to L level and raises the output of IC808-4 to "H" level.

Meanwhile, terminal ⑨ of IC809-4 drops to "L" level, raising the output of IC809-4 to "H" level.

When both inputs of IC808-3 is at "H" level, the output will be "L" level, then terminal ㊴ of IC803 will be "L" level, providing 100 Hz increment displays.

When the TUNING knob is pulled, a signal consisting of mixture of the signals from VCO_1 and VCO_2 is supplied to terminal ⑨ of IC803 and a counting operation takes place by the counter within the IC. At this time, the signal supplied to terminal ㉝ is also counted.

When the TUNING knob is pushed in, the frequency immediately prior to the control knob's being pushed in is latched and memorized. Also, the frequency of VCO_1 is changed from a state of free-running to a locked state.

A signal consisting of a mixture of the signals from Q703 and Q604 (VFO) is supplied to terminal ㉝ of IC803. When the TUNING control knob is turned at this time, the rotation is detected by a photo-coupler Q406 and this signal is supplied to terminal ㉞. [See Fig. 5.]

When the level of terminal ㊳ (CD) changes from "H" to "L" or from "L" to "H", the signal applied to terminal ㉝ will be counted by the counter within.

At this time, once the contents of the counter are rewritten, the counter stops counting until the level of terminal ㊳ next changes to "H" or "L".

When the TUNING knob is turned eigher fully clockwise or counter-clockwise, the lower three digits of the digital display will go out. This is because certain numbers have been preset on the counter within the IC so that when the numbers are exceeded, a blanking signal is automatically generated.

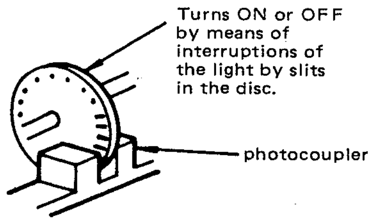

Turns ON or OFF by means of interruptions of the light by slits in the disc.
photocoupler

Fig. 5

- **Mode Selecting**

Selecting of the mode of reception is carried out by changing terminals ㉞ to ㊱ of IC803 to "H" or "L" level.

Terminal No. of IC803 / Mode	㉞	㉟	㊱
AM	0	0	0
USB	0	1	0
LSB	1	0	0

1 = H
0 = L

- **The Function of Terminal ㊴ (CS) of IC803**

When this terminal is at "H" level, PLL will be released from the locked condition and the VCO_1 will be in free-running condition. At this time, the receiving frequency is controlled by the VCO_1 alone. (TUNING knob-pulled.)

- **The Function of Terminal ㊳ (CD) of IC803**

Terminal ㊴ functions only at "L" level, detects the rotation of the dial, and supplies the signal.

The frequency of the VFO is counted when the level at terminal ㊴ changes from "H" to "L" or "L" to "H".

When once counted, the counter stops until the level at terminal ㊳ changes from "L" to "H" or "H" to "L" the next time.

- **SEARCH Circuit**

Since the frequency display changes when the TUNING knob is pushed in from a pulled out condition, it may cause inconvenience. By depressing switch S402 a display of the previous frequency will be provided. The description of this circuit will be given below.

When S402 in Fig. 4 is set to the "ON" position, terminal ⑨ of IC809-4 rises to "H" level. This is the same condition as when the TUNING knob is pulled, and so terminal ㊴ of IC803 rises to "H" level.

When terminal ㊴ of IC803 is at "H" level, a signal consisting of a mixture of the signals from VCO_1 and VCO_2 is being counted by IC803, and so this frequency will then be displayed.

When the TUNING control knob is pushed in, the variable capacitor of VCO_1 cloes not mechanically rotate. On the other side, when terminal ㊴ rises to "H" level, only a certain voltage is applied to the variable capacitance diode of VCO_1 and VCO_1 will oscillate at the frequency it was oscillating before the TUNING knob was pushed in.

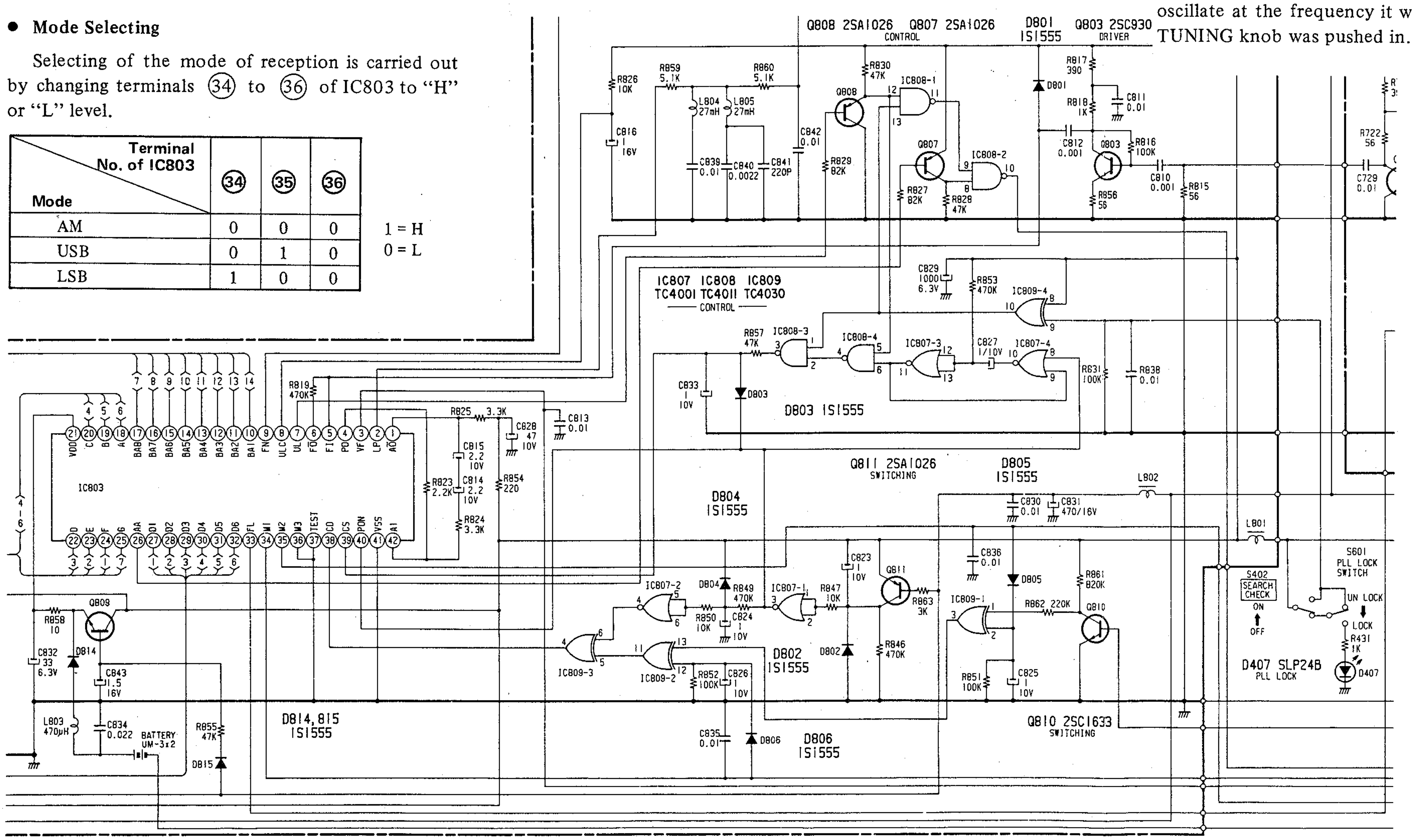

Q808 2SA1026
Q807 2SA1026
CONTROL
D801 1S1555
Q803 2SC930
DRIVER
IC807 IC808 IC809
TC4001 TC4011 TC4030
CONTROL
IC803
D803 1S1555
Q811 2SA1026
SWITCHING
D805 1S1555
D804 1S1555
D802 1S1555
D806 1S1555
D814,815 1S1555
Q810 2SC1633
SWITCHING
Q809
BATTERY UM-3×2
S402 SEARCH CHECK
ON
OFF
S601 PLL LOCK SWITCH
UN LOCK
LOCK
D407 SLP24B
PLL LOCK
L801
L802
L803 470μH
L804 27mH
L805 27mH
IC808-1
IC808-2
IC808-3
IC808-4
IC807-1
IC807-2
IC807-3
IC807-4
IC809-1
IC809-2
IC809-3
IC809-4

Fig. 4

- **Control Circuit**

* On MUTING

The schematic diagram shown in Fig. 6 is the muting circuit.

The MUTING circuit is designed so that muting is performed when the frequency of the received signal is 0 Hz. The muting signal is produced at terminal ㉖ of IC803.

When the frequency of the received signal is 0 Hz, terminal ㉖ is at "H" level. Therefore, Q807 is "OFF" and terminal ⑧ of IC808-2 drops to "L" level, while terminal ⑩ rises to "H" level, turning Q405 "ON" to perform muting.

Whenever the frequency of the received signal being received is anything other than 0 Hz, terminal ㉖ of IC803 is at "L" level, Q807 turns "ON" and terminal ⑧ of IC808-2 goes to "H" level.

Meanwhile, terminal ⑪ of IC808-1 is constantly at "H" level and terminal ⑩ of IC808-2 drops to "L" level turning Q405 "OFF".

- **Under Switch Power "ON"**

When the power is switched "ON", terminals ①, ② of IC807-1 rises to "H" level for a certain length of time by C823 and R846. Therefore, terminal ③ will be at "L" level for a certain length of time.

Therefore, terminal ㊵ (PON) of IC803 also drops to "L" level for a certain length of time.

As long as terminal ㊵ is at "L" level, inputs to terminals ㊳ (CD) and ㊴ (CS) are inhibited.

- **Control of Terminal ㊴ (CS) of IC803**

If the TUNING knob is pulled, turned and pushed in after the power has been switched off, or if the backup battery should run down, the preset value of the programmable counter in IC803 will change, and so the counter display readouts will become incorrect.

The following circuit functions in order to prevent this from happening.

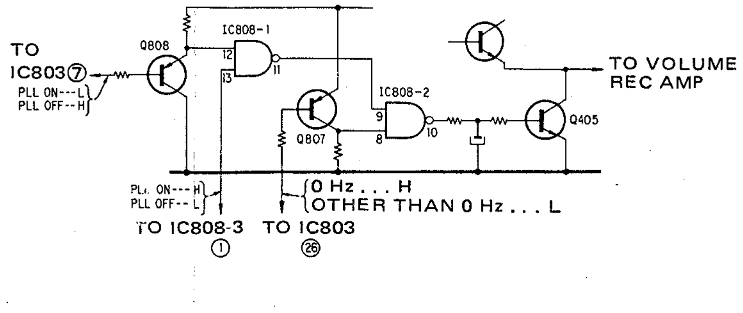

TO IC803⑦
PLL ON---L
PLL OFF---H
Q808
IC808-1
12
13
11
IC808-2
9
8
10
Q807
Q405
TO VOLUME REC AMP
PLL ON---H
PLL OFF---L
TO IC808-3
①
0 Hz . . . H
OTHER THAN 0 Hz . . . L
TO IC803
㉖

Fig. 6

No:
before
minal
but in
termin
termin
Wh
and te
Me:
conne
level f
minal
of IC8
⑩
Ho
rises t
"L" l
starts
termin
Theref
level.
level,
fore, t
the le
level.
Wh
voltage
IC807
to "L"
level.
The
level.
Du
"H" le
Wh
level, t
state c
freque
quency
counte
The
knob i
soon a
quency

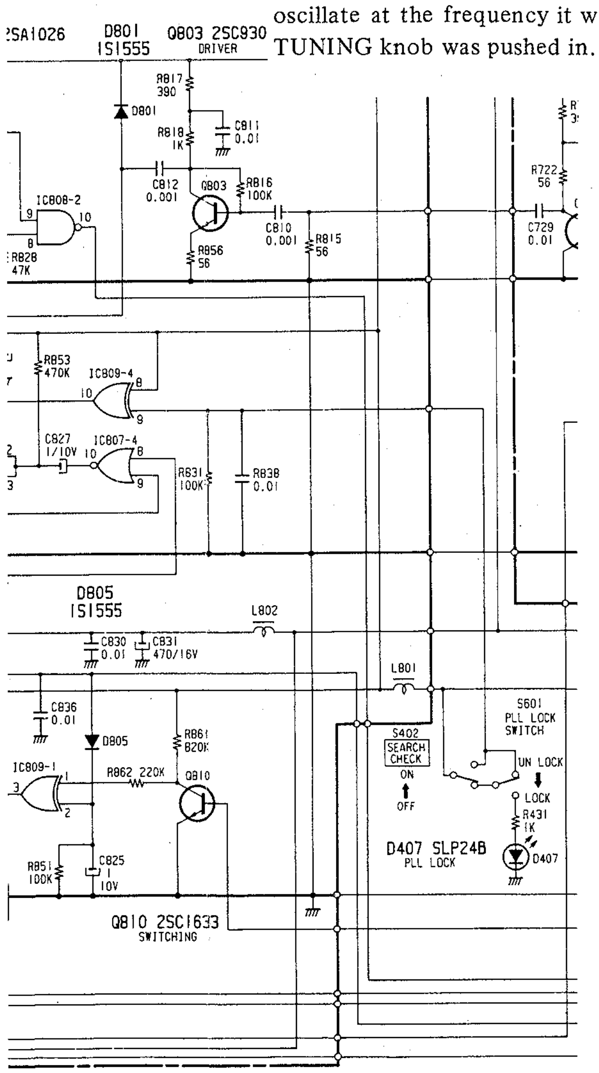
- Cor

How t
"H" l
ON ha
three
changi
level a
This
even i

3

ill be
VCO₁
e, the
alone.

03
etects
n the
L" or
il the
H" or



- **SEARCH Circuit**

Since the frequency display changes when the TUNING knob is pushed in from a pulled out condition, it may cause inconvenience. By depressing switch S402 a display of the previous frequency will be provided. The description of this circuit will be given below.

When S402 in Fig. 4 is set to the "ON" position, terminal ⑨ of IC809-4 rises to "H" level. This is the same condition as when the TUNING knob is pulled, and so terminal ㊴ of IC803 rises to "H" level.

When terminal ㊴ of IC803 is at "H" level, a signal consisting of a mixture of the signals from VCO₁ and VCO₂ is being counted by IC803, and so this frequency will then be displayed.

When the TUNING control knob is pushed in, the variable capacitor of VCO₁ cloes not mechanically rotate. On the other side, when terminal ㊴ rises to "H" level, only a certain voltage is applied to the variable capacitance diode of VCO₁ and VCO₁ will oscillate at the frequency it was oscillating before the TUNING knob was pushed in.

- **Control Circuit**

* On MUTING

The schematic diagram shown in Fig. 6 is the muting circuit.

The MUTING circuit is designed so that muting is performed when the frequency of the received signal is 0 Hz. The muting signal is produced at terminal ㉖ of IC803.

When the frequency of the received signal is 0 Hz, terminal ㉖ is at "H" level. Therefore, Q807 is "OFF" and terminal ⑧ of IC808-2 drops to "L" level, while terminal ⑩ rises to "H" level, turning Q405 "ON" to perform muting.

Whenever the frequency of the received signal being received is anything other than 0 Hz, terminal ㉖ of IC803 is at "L" level, Q807 turns "ON" and terminal ⑧ of IC808-2 goes to "H" level.

Meanwhile, terminal ⑪ of IC808-1 is constantly at "H" level and terminal ⑩ of IC808-2 drops to "L" level turning Q405 "OFF".

- **Under Switch Power "ON"**

When the power is switched "ON", terminals ①, ② of IC807-1 rises to "H" level for a certain length of time by C823 and R846. Therefore, terminal ③ will be at "L" level for a certain length of time.

Therefore, terminal ㊵ (PON) of IC803 also drops to "L" level for a certain length of time.

As long as terminal ㊵ is at "L" level, inputs to terminals ㊳ (CD) and ㊴ (CS) are inhibited.

- **Control of Terminal ㊴ (CS) of IC803**

If the TUNING knob is pulled, turned and pushed in after the power has been switched off, or if the backup battery should run down, the preset value of the programmable counter in IC803 will change, and so the counter display readouts will become incorrect.

The following circuit functions in order to prevent this from happening.

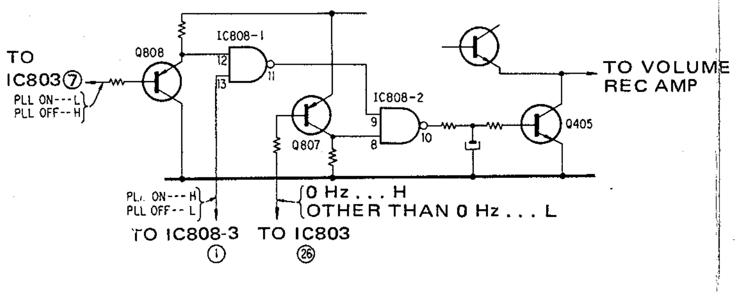


Fig. 6

Normally, after switching the power "ON" and before terminal ㊵ (PON) rises to "H" level, terminal ⑦ (UL) drops from "H" level to "L" level, but in such abnormal situations as described above, terminal ⑦ (UL) will rise to "H" level even when terminal ㊵ (PON) is at "H" level.

When it rises to "H" level, Q808 will turn OFF, and terminal ⑤ of IC808-4 will rise to "H" level.

Meanwhile, as terminal ㊵ (PON) of IC803 is connected to terminal ⑧ IC807-4, it will be at "L" level for a while after the power is switched ON. Terminal ⑨ of IC807-4 is connected to terminal ⑪ of IC807-3 and is at "L" level. Therefore, terminal ⑩ of IC807-4 rises to "H" level.

However, when terminal ㊵ (PON) of IC803 rises to "H" level, terminal ⑩ of IC807-4 drops to "L" level. Therefore, a charging current to C827 starts flowing through R853. At the same time, terminals ⑫, ⑬ of IC807-3 drops to "L" level. Therefore, terminal ⑪ of IC807-4 rises to "H" level. Terminals ⑤, ⑥ of IC808-4 rises to "H" level, and terminal ④ drops to "L" level. Therefore, terminal ③ of IC808-3 rises to "H" level, and the level at terminal ㊴ (CS) of IC803 rises to "H" level.

When the charged current at C827 reaches the voltage to raise the level at terminal ⑫, ⑬ of IC807 to "H" level, terminal ⑪ of IC807-3 drops to "L" level and terminal ④ of IC808-4 rises to "H" level.

Therefore, terminal ③ of IC808-3 drops to "L" level.

During PLL lock, terminal ① of IC808-3 is at "H" level.

When terminal ㊴ of IC803 is raised to "H" level, the PLL circuit changes from a locked state to a state of free-running, and VCO₁ rises to a certain frequency. The VFO also rises to a certain frequency. These two frequencies are counted by the counter within IC803.

Therefore, the frequency to which the TUNING knob is tuned is counted once again by IC803, and as soon as terminal ㊴ drops to "L" level, the frequency is latched and memorized.

- **Control of Terminal ㊳ (CD) of IC803**

How terminal ㊵ (PON) changes from "L" level to "H" level little after the power has been switched ON has already been mentioned before. The lower three digits of the digital counter are counted by changing terminal ㊳ (CD) from "H" level to "L" level after terminal ㊵ has come to "H" level.

This is to enable correct display of the frequency, even if the TUNGIN knob is turned after the power has been switched "OFF". IC807-2 and IC809-3 are provided for this purpose. When the power is switched "ON", terminal ③ of IC807-1 rises to "H" level after a slight time-lag, and the signal is supplied to the lagging network comprised of R849 and C824.

IC807-2 is an inverter. After the power has been switched "ON", terminal ④ of IC807-2 stays at "H" level until the charging of C824 has attained a certain potential.

When the charging potential of C824 has attained a certain level, it now changes to "L" level.

The role of terminal ㊳ (CD) has already been discussed; it is to carry out a display of the lower three digits of the frequency during PLL lock. When the level of terminal ㊳ (CD) is changed from "H" to "L" level or from "L" to "H" level, while terminal ㊴ (CS) is at "L" level, it counts the frequency of the VFO.

- **Timing Chart of Each Section**

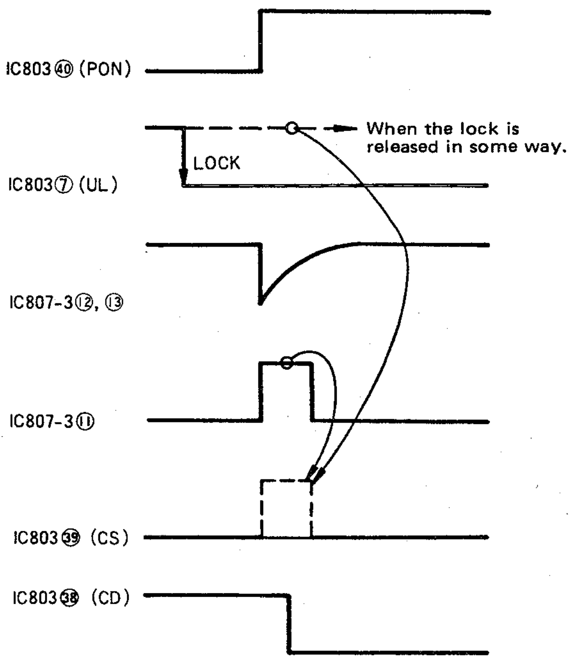
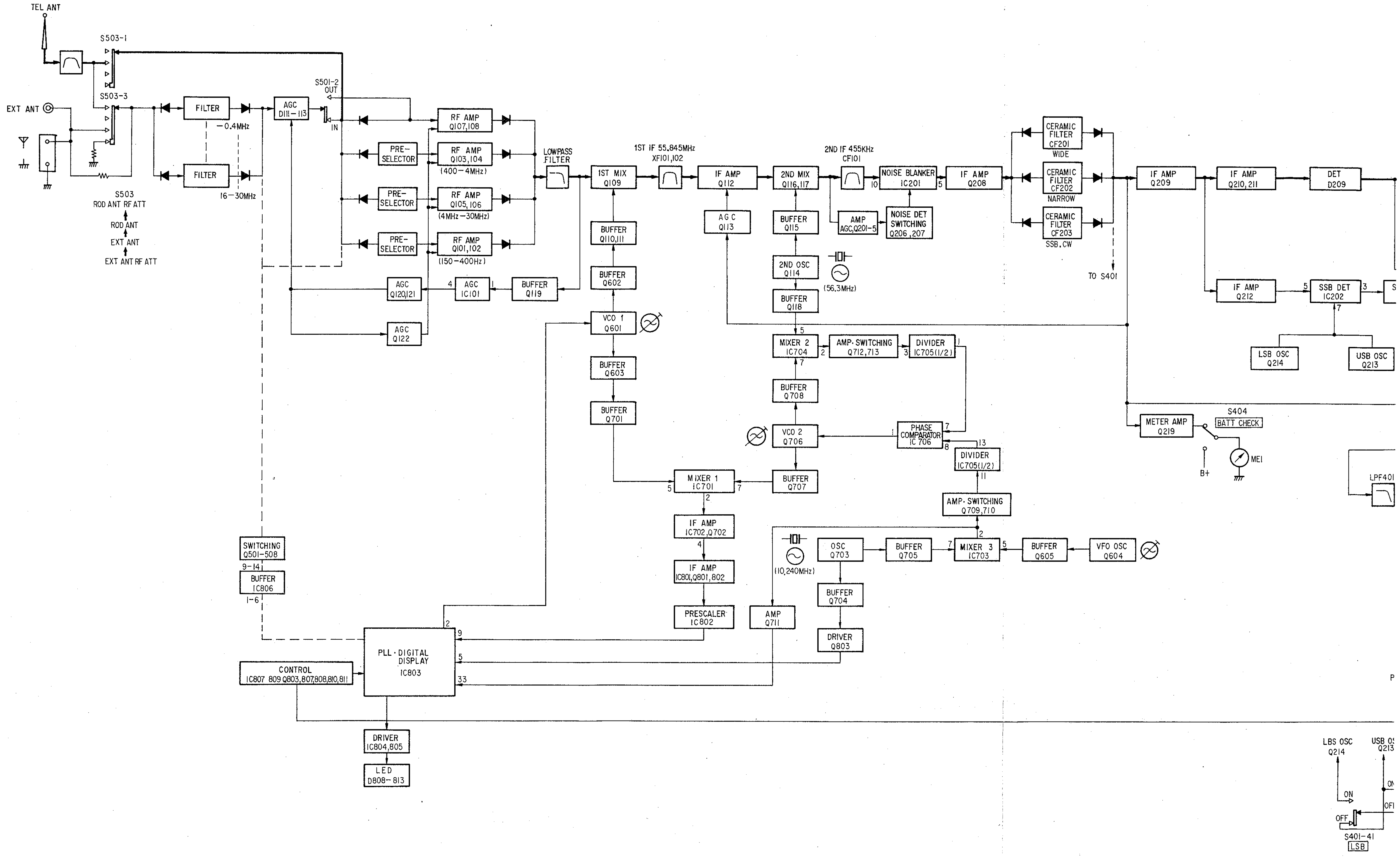
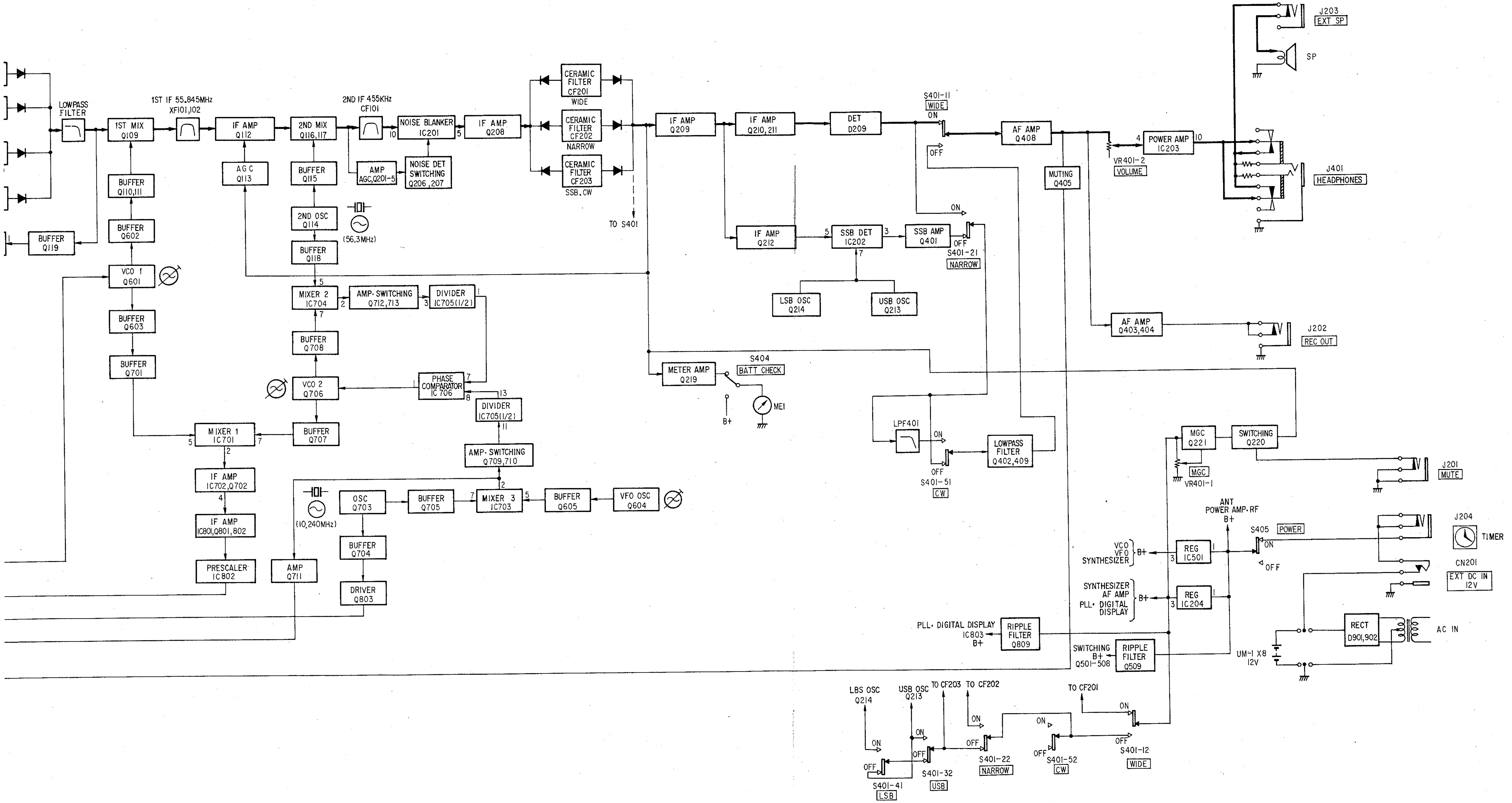


Fig. 7

1-2. BLOCK DIAGRAM

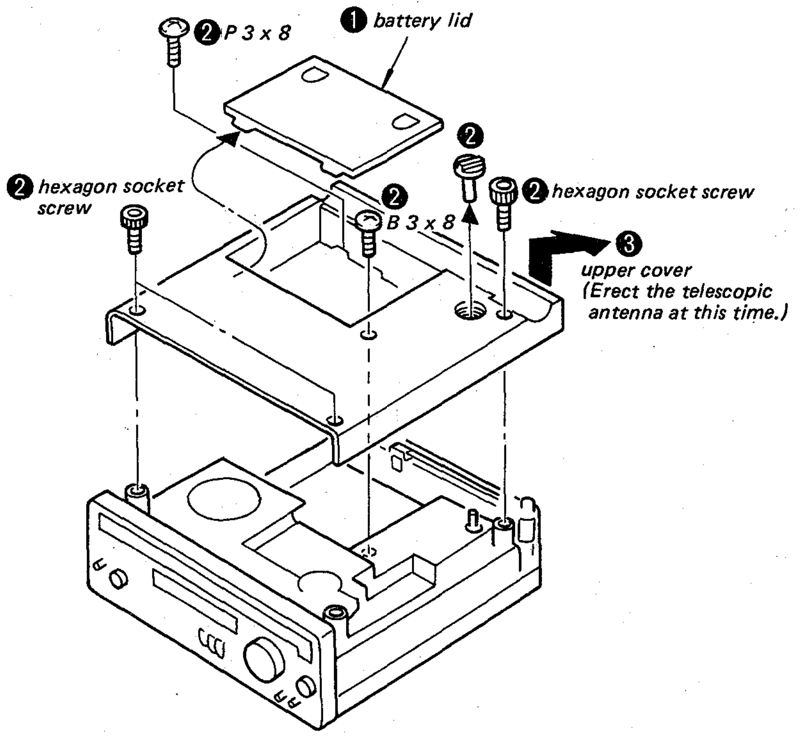

TEL ANT
S503-1
S503-3
EXT ANT
S503
ROD ANT RF ATT
ROD ANT
EXT ANT
EXT ANT RF ATT
FILTER
−0.4MHz
FILTER
16−30MHz
AGC
D111−113
S501-2
OUT
IN
RF AMP
Q107,108
PRE-SELECTOR
RF AMP
Q103,104
(400−4MHz)
PRE-SELECTOR
RF AMP
Q105,106
(4MHz−30MHz)
PRE-SELECTOR
RF AMP
Q101,102
(150−400Hz)
LOWPASS FILTER
1ST IF 55.845MHz
XF101,102
1ST MIX
Q109
BUFFER
Q110,111
BUFFER
Q602
VCO 1
Q601
BUFFER
Q603
BUFFER
Q701
AGC
Q120,121
AGC
IC101
BUFFER
Q119
AGC
Q122
IF AMP
Q112
AGC
Q113
2ND IF 455KHz
CF101
2ND MIX
Q116,117
BUFFER
Q115
2ND OSC
Q114
(56.3MHz)
BUFFER
Q118
NOISE BLANKER
IC201
AMP
AGC,Q201−5
NOISE DET SWITCHING
Q206,207
IF AMP
Q208
CERAMIC FILTER
CF201
WIDE
CERAMIC FILTER
CF202
NARROW
CERAMIC FILTER
CF203
SSB,CW
TO S401
IF AMP
Q209
IF AMP
Q210,211
DET
D209
IF AMP
Q212
SSB DET
IC202
LSB OSC
Q214
USB OSC
Q213
MIXER 2
IC704
AMP·SWITCHING
Q712,713
DIVIDER
IC705(1/2)
BUFFER
Q708
VCO 2
Q706
PHASE COMPARATOR
IC 706
DIVIDER
IC705(1/2)
AMP·SWITCHING
Q709,710
METER AMP
Q219
S404
BATT CHECK
B+
ME1
LPF401
MIXER 1
IC701
BUFFER
Q707
IF AMP
IC702,Q702
IF AMP
IC801,Q801,802
PRESCALER
IC802
AMP
Q711
(10,240MHz)
OSC
Q703
BUFFER
Q705
MIXER 3
IC703
BUFFER
Q605
VFO OSC
Q604
BUFFER
Q704
DRIVER
Q803
SWITCHING
Q501−508
9−14
BUFFER
IC806
1−6
PLL·DIGITAL DISPLAY
IC803
CONTROL
IC807 809 Q803,807,808,810,811
DRIVER
IC804,805
LED
D808−813
LBS OSC
Q214
USB OSC
Q213
ON
OFF
S401-41
LSB


LOWPASS FILTER
1ST MIX Q109
1ST IF 55.845MHz XF101,102
IF AMP Q112
2ND MIX Q116,117
2ND IF 455KHz CF101
NOISE BLANKER IC201
IF AMP Q208
CERAMIC FILTER CF201 WIDE
CERAMIC FILTER CF202 NARROW
CERAMIC FILTER CF203 SSB.CW
TO S401
AGC Q113
BUFFER Q115
AMP AGC,Q201-5
NOISE DET SWITCHING Q206,207
BUFFER Q110,111
BUFFER Q602
BUFFER Q119
VCO 1 Q601
BUFFER Q603
BUFFER Q701
2ND OSC Q114
(56.3MHz)
BUFFER Q118
MIXER 2 IC704
AMP·SWITCHING Q712,713
DIVIDER IC705(1/2)
BUFFER Q708
VCO 2 Q706
PHASE COMPARATOR IC706
DIVIDER IC705(1/2)
MIXER 1 IC701
BUFFER Q707
AMP·SWITCHING Q709,710
IF AMP IC702,Q702
IF AMP IC801,Q801,802
PRESCALER IC802
AMP Q711
(10,240MHz)
OSC Q703
BUFFER Q705
MIXER 3 IC703
BUFFER Q605
VFO OSC Q604
BUFFER Q704
DRIVER Q803
IF AMP Q209
IF AMP Q210,211
DET D209
S401-11 WIDE
ON
OFF
AF AMP Q408
MUTING Q405
VR401-2 VOLUME
POWER AMP IC203
J203 EXT SP
SP
J401 HEADPHONES
IF AMP Q212
SSB DET IC202
SSB AMP Q401
S401-21 NARROW
LSB OSC Q214
USB OSC Q213
AF AMP Q403,404
J202 REC OUT
METER AMP Q219
S404 BATT CHECK
B+
ME1
LPF401
S401-51 CW
LOWPASS FILTER Q402,409
MGC Q221
SWITCHING Q220
MGC VR401-1
J201 MUTE
ANT POWER AMP·RF B+
S405 POWER
J204 TIMER
CN201 EXT DC IN 12V
VCO VFO SYNTHESIZER B+
REG IC501
SYNTHESIZER AF AMP PLL· DIGITAL DISPLAY B+
REG IC204
PLL· DIGITAL DISPLAY IC803 B+
RIPPLE FILTER Q809
SWITCHING B+ Q501-508
RIPPLE FILTER Q509
RECT D901,902
AC IN
UM-1 X8 12V
LBS OSC Q214
USB OSC Q213
TO CF203
TO CF202
TO CF201
S401-41 LSB
S401-32 USB
S401-22 NARROW
S401-52 CW
S401-12 WIDE

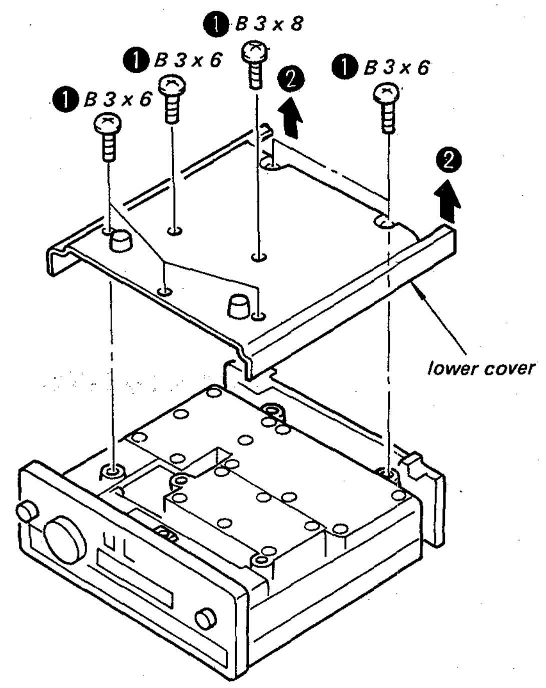
- Follow the disassembly procedure in the numerical order (❶ —····, or △1 —····) given.

SECTION 2
DISASSEMBLY

UPPER COVER

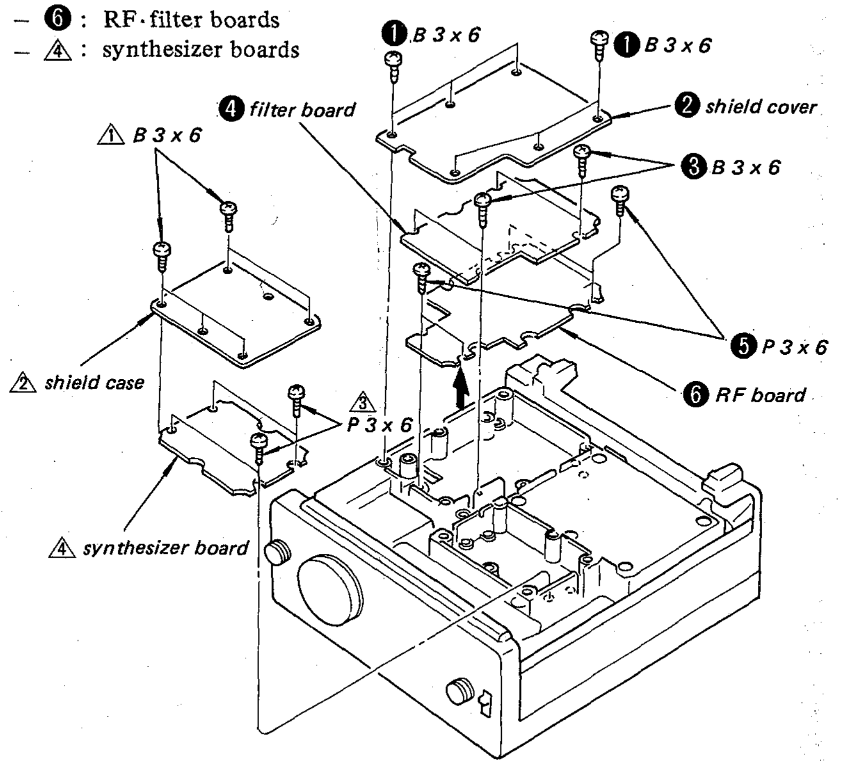

❷P 3 x 8
❶ battery lid
❷ hexagon socket screw
❷
❷B 3 x 8
❷ hexagon socket screw
❸ upper cover (Erect the telescopic antenna at this time.)

LOWER COVER


❶B 3 x 8
❶B 3 x 6
❶B 3 x 6
❶B 3 x 6
❷
❷
lower cover

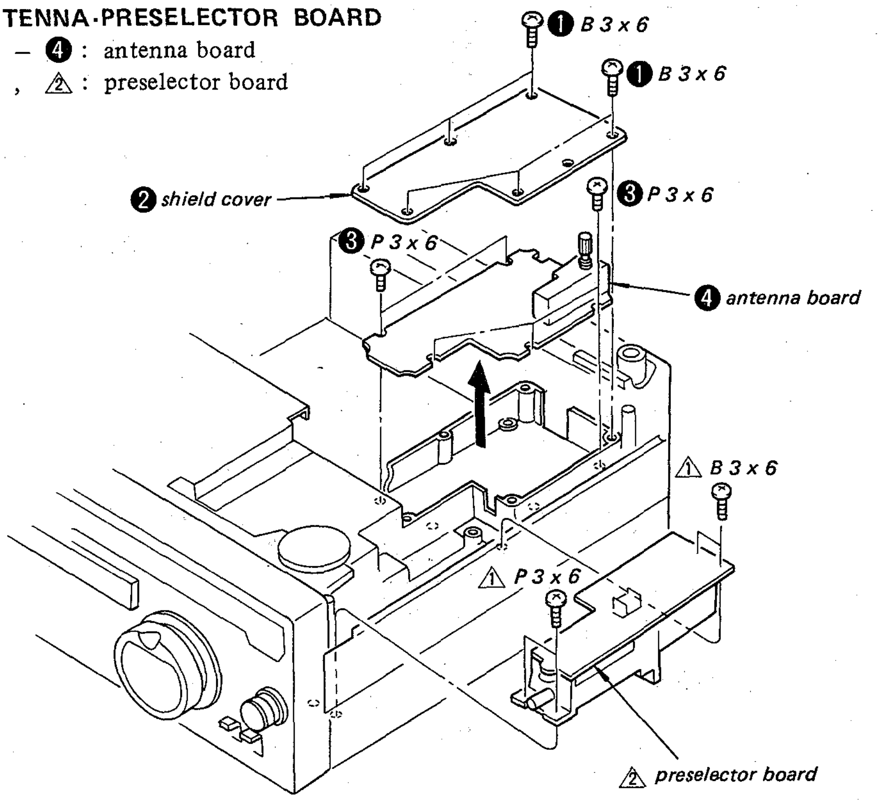
FILTER·RF· SYNTHESIZER BOARDS

❶ – ❻ : RF·filter boards
△1 – △4 : synthesizer boards


❶B 3 x 6
❶B 3 x 6
❷ shield cover
❹ filter board
△1 B 3 x 6
❸B 3 x 6
❺P 3 x 6
△2 shield case
△3 P 3 x 6
❻ RF board
△4 synthesizer board

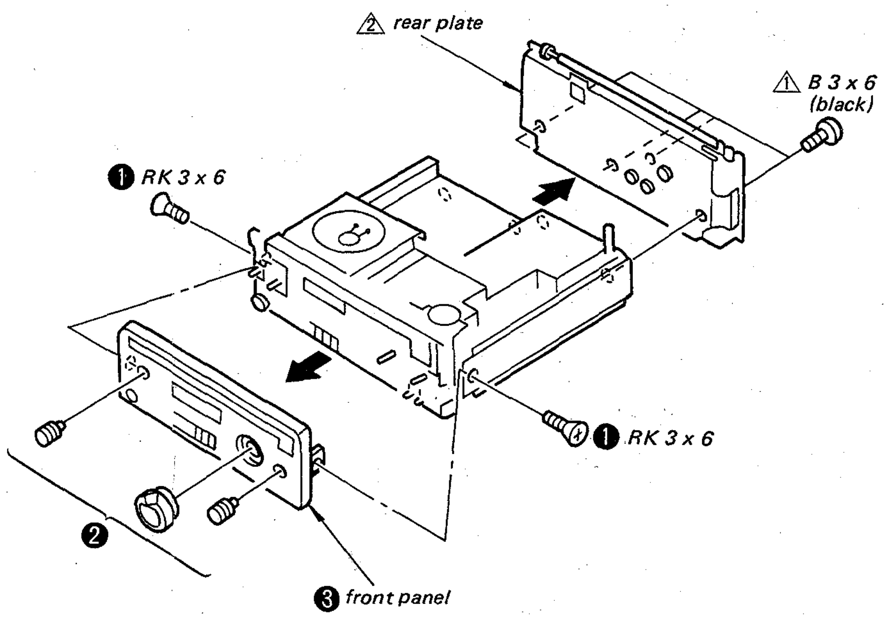
ANTENNA·PRESELECTOR BOARD

❶ – ❹ : antenna board
△1 , △2 : preselector board


❶B 3 x 6
❶B 3 x 6
❷ shield cover
❸P 3 x 6
❸P 3 x 6
❹ antenna board
△1 B 3 x 6
△1 P 3 x 6
△2 preselector board

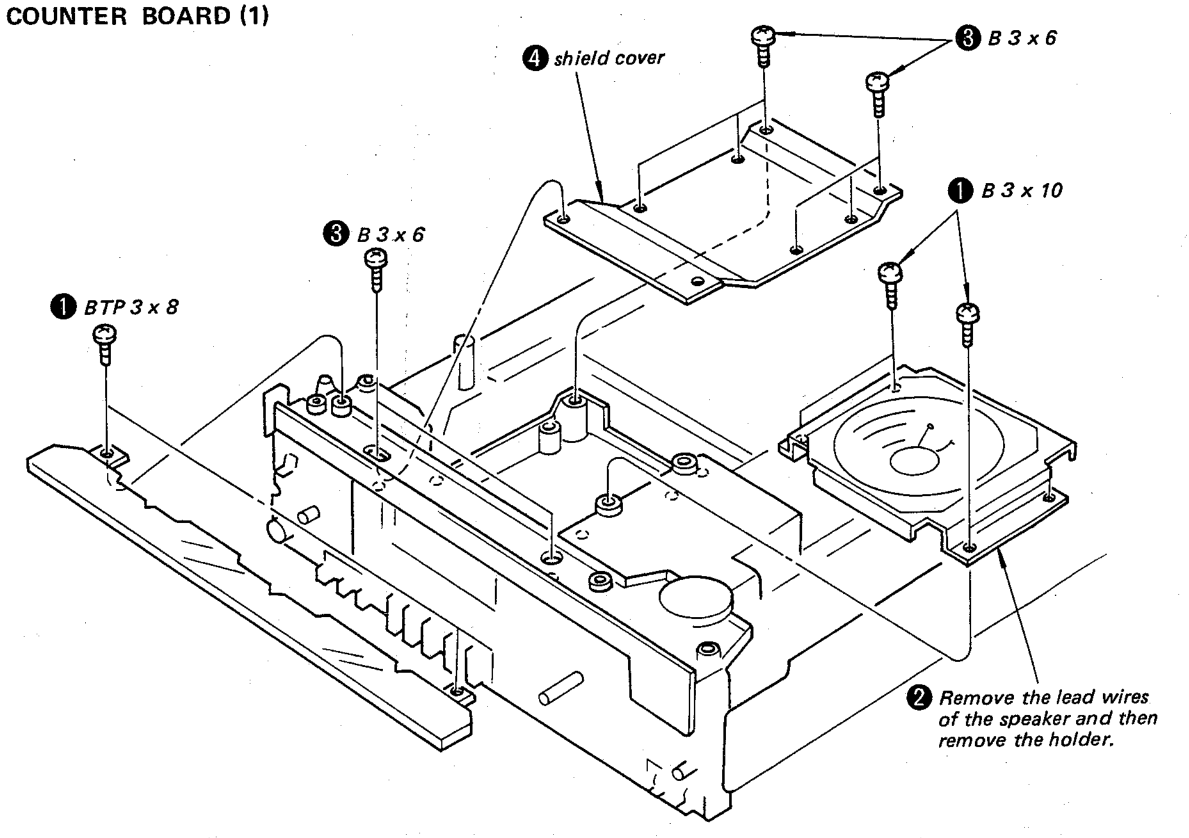
FRONT PANEL · REAR PANEL

❶ – ❸ : front panel
△1 , △2 : rear panel

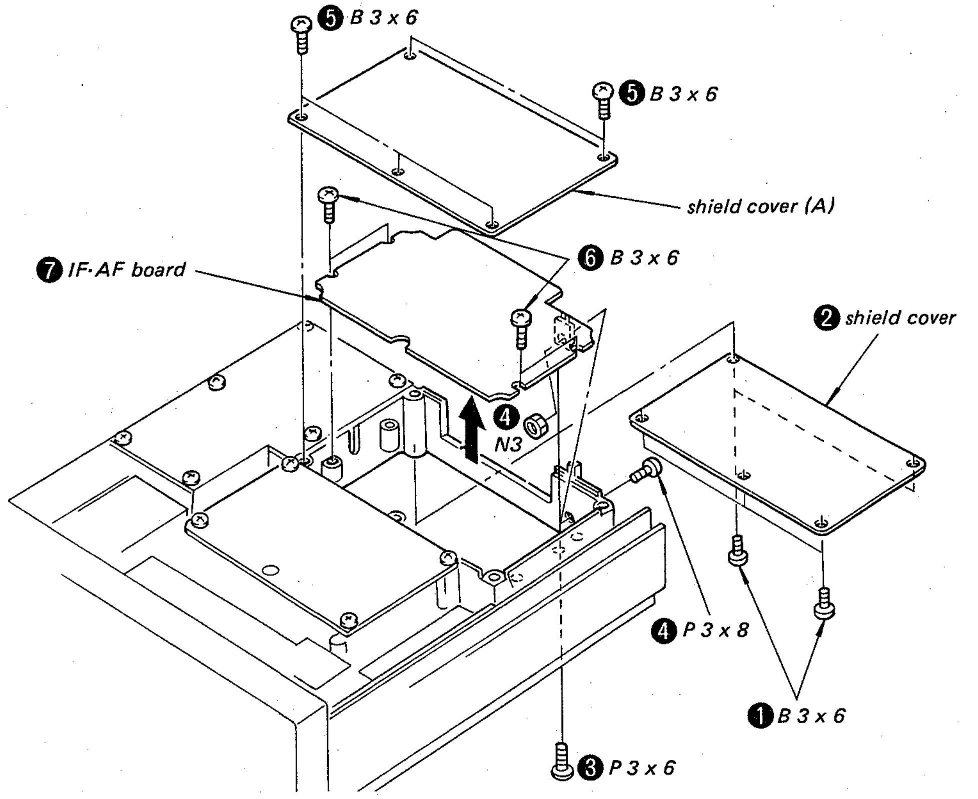

△2 rear plate
△1 B 3 x 6 (black)
❶RK 3 x 6
❶RK 3 x 6
❷
❸ front panel

Just remove the front panel.

COUNTER BOARD (1)


❹ shield cover
❸ B 3 x 6
❶ B 3 x 10
❸ B 3 x 6
❶ BTP 3 x 8
❷ Remove the lead wires of the speaker and then remove the holder.

IF · AF BOARD

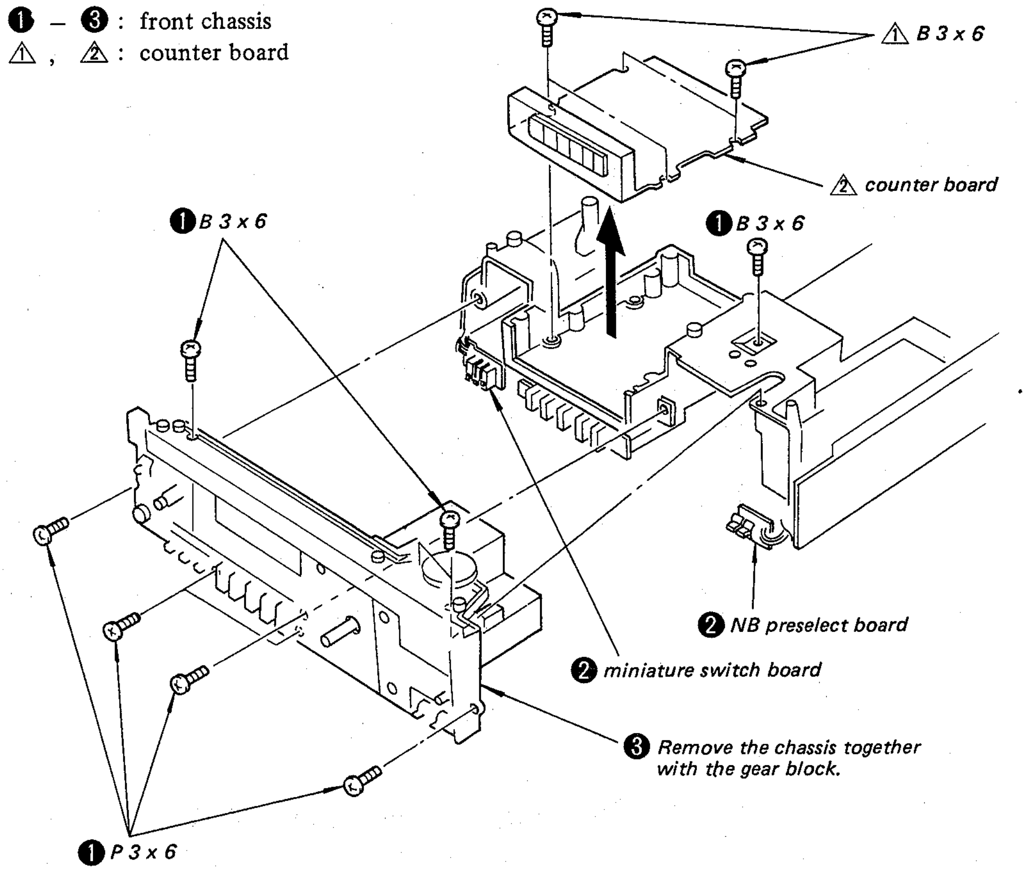

❺ B 3 x 6
❺ B 3 x 6
shield cover (A)
❻ B 3 x 6
❼ IF·AF board
❷ shield cover
❹
N3
❹ P 3 x 8
❶ B 3 x 6
❸ P 3 x 6

Just remove the rear panel.

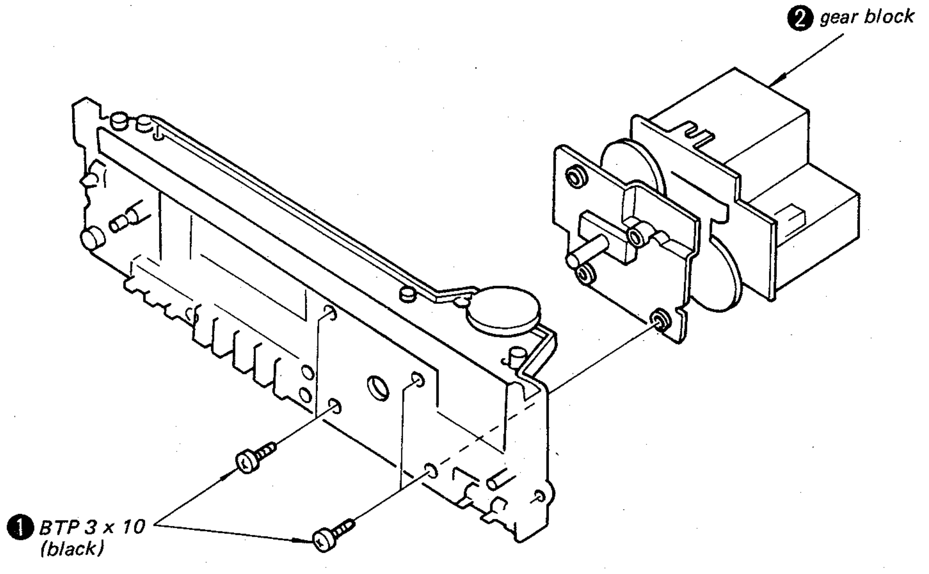
FRONT CHASSIS · COUNTER BOARD

❶ – ❸ : front chassis

△1 , △2 : counter board

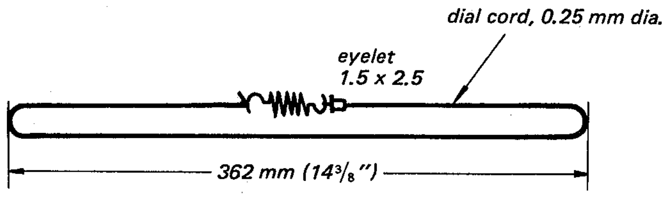

△1 B 3 x 6
△2 counter board
❶ B 3 x 6
❶ B 3 x 6
❷ NB preselect board
❷ miniature switch board
❸ Remove the chassis together with the gear block.
❶ P 3 x 6

GEAR BLOCK

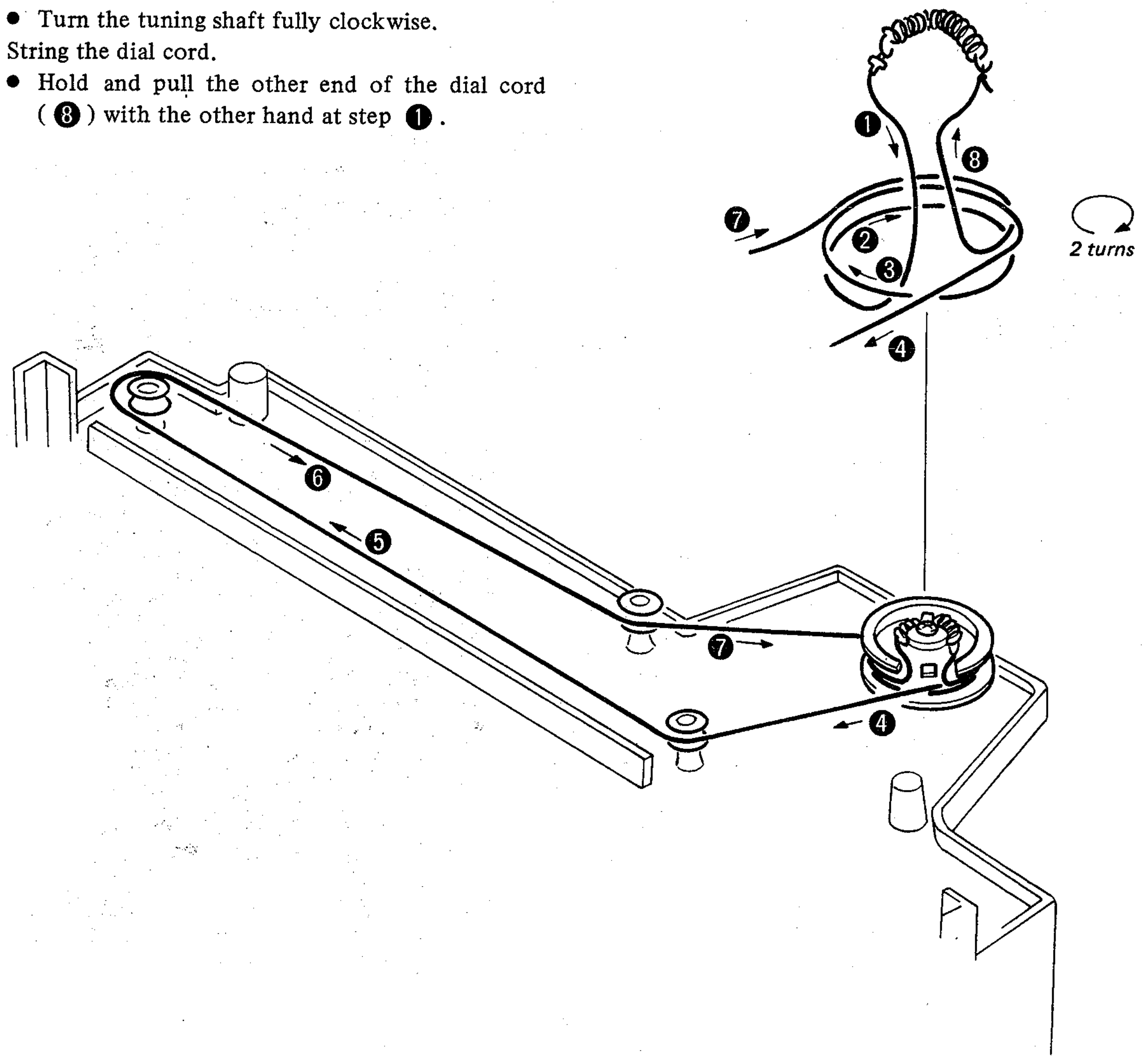

❷ gear block
❶ BTP 3 x 10 (black)

DIAL CORD STRINGING

1. Preparation.


dial cord, 0.25 mm dia.
eyelet
1.5 x 2.5
362 mm (14³/₈")

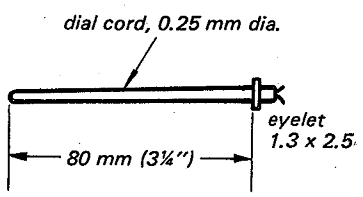
2. Stringing.
   - Turn the tuning shaft fully clockwise.
3. String the dial cord.
   - Hold and pull the other end of the dial cord (❽) with the other hand at step ❶.


❶
❷
❸
❹
❺
❻
❼
❽
2 turns

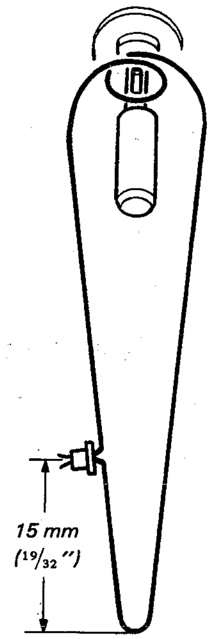
4. Dial Pointer Setting.
   - Set the dial pointer so that the figure on the frequency counter and the figure on the dial scale match together.
     Confirm that the dial pointer does not slip when turning the TUNING knob.
   - Fix the dial pointer with a locking compound.

PRESELECTOR CORD STRINGING

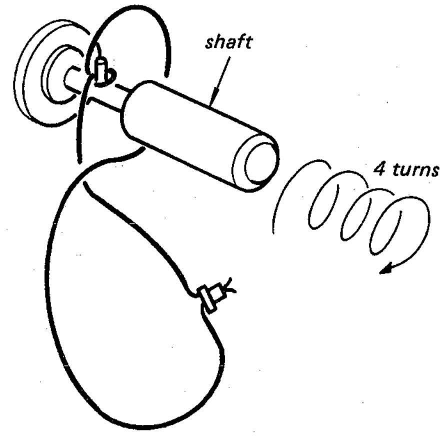
1. Preparation.


dial cord, 0.25 mm dia.
eyelet
1.3 x 2.5
80 mm (3¼")

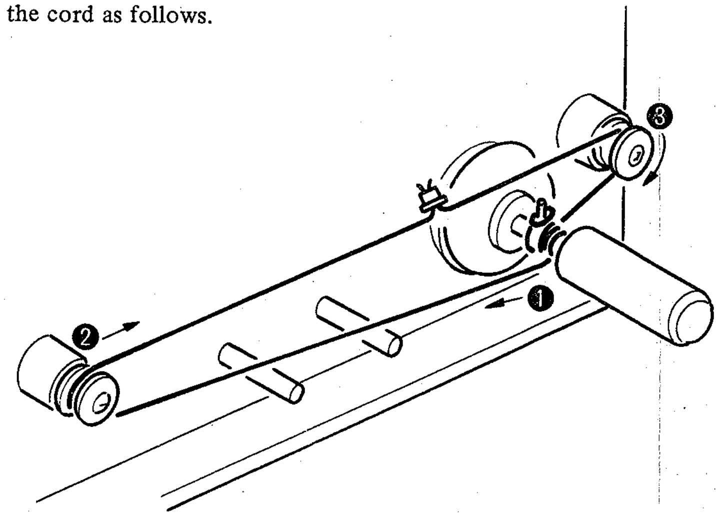
2. String the cord so that the eyelet comes to the position shown below.



3. String the cord four times around the shaft.


shaft
4 turns

4. String the cord as follows.



5. Dial Pointer Setting.
   - Install the front panel. Set the dial pointer so that the figure on the frequency counter and the figure on the dial scale match together.
     Confirm that the dial pointer does not slip when turning the TUNING knob.
   - Fix the dial pointer with a locking compound.

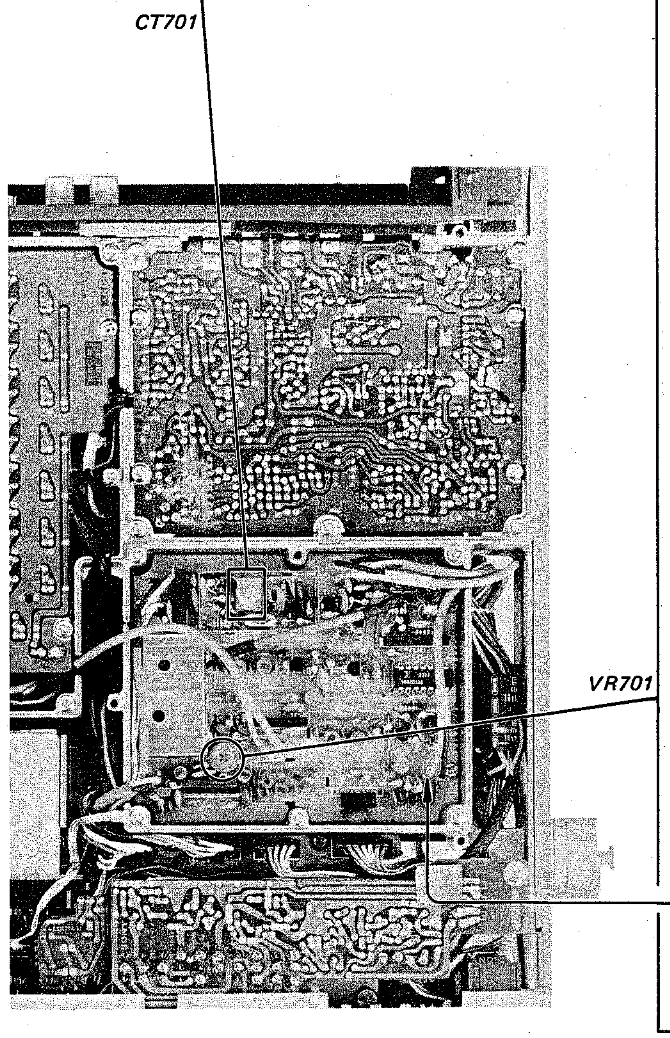
SECTION 3
ADJUSTMENTS

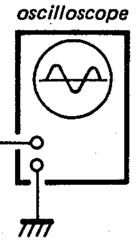
When performing the adjustment generally, perform in the order as follows.

1. Synthesizer Section Adjustments
   ① reference frequency osc adjustment
   ② secondary local osc adjustment
   ③ mixer balance adjustment
   ④ VFO frequency coverage adjustment
   ⑤ VCO_2 adjustment
   ⑥ VCO_1 frequency coverage adjustment
2. IF Adjustments
   ① IF adjustment 1
   ② IF adjustment 2
3. Preselector Adjustment

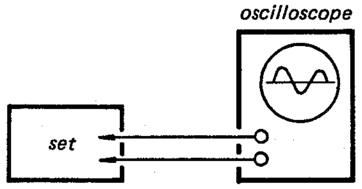
Reference Frequency Osc Adjustment (10.24 MHz)

1. Turn CT701 and adjust for 10.24 MHz frequency osc.
   Specification: 10.24 MHz±10 Hz



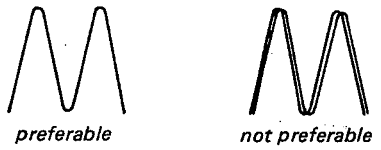


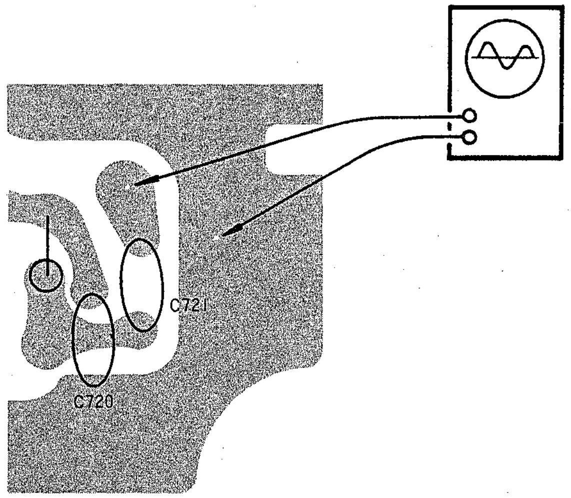
Mixer Balance Adjustment



Use an oscilloscope capable of 50 MHz measurement.

1. Turn the TUNING knob and obtain 30 MHz.
2. Turn VR701 and obtain a clear preferable waveform on the oscilloscope.

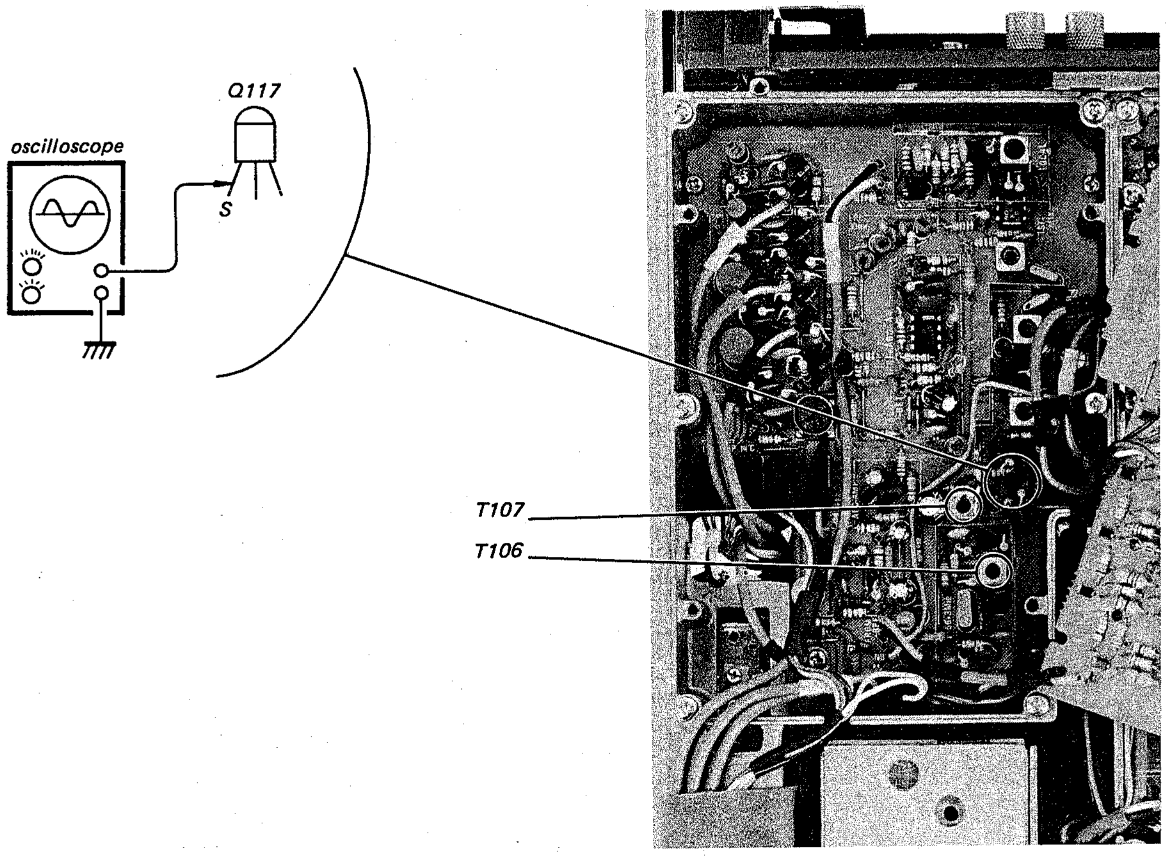




Secondary Local Osc Adjustment (56.3 MHz)

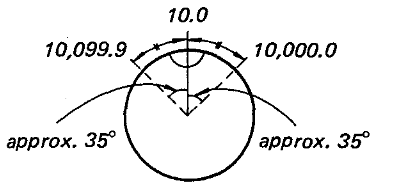
Setting: MODE switch – NARROW

1. Turn the core of T106 fully clockwise. (The oscillation will stop.)
2. Next, gradually turn T106 counterclockwise. Then the oscillation will start again.
   Memorize the point where the waveform reaches the maximum point.
3. Continue turning the core of T106 counterclockwise, then the waveform will become small. Set the core where the waveform is 15 % smaller than at the maximum point.
4. Turn the core of T107 and adjust for the maximum waveform.



VFO Frequency Coverage Adjustment

1. Pull the TUNING knob, turn and set to 10.0 MHz. Then push in the knob and turn it fully counterclockwise.
2. Adjust CT602 to obtain 10,000.0 digital frequency display.
3. Turn the TUNING knob fully clockwise and adjust the core of L604 to obtain 10,099.9 digital frequency display.
4. Repeat steps 1 – 3 several times.
5. First turn the TUNING knob fully counterclockwise and set at 10,000.0. Then turn it a little clockwise and set at 10,005.0. (The angle of the knob at this time is approx. 35° from the left.)
6. Under this condition, adjust CT602 to obtain 10,000.0 digital frequency display.
7. Turn the TUNING knob fully clockwise and then approx. 35° counterclockwise.
8. Adjust the core of L604 to obtain 10,099.9 digital frequency display.
9. Repeat steps 5 – 8 several times.



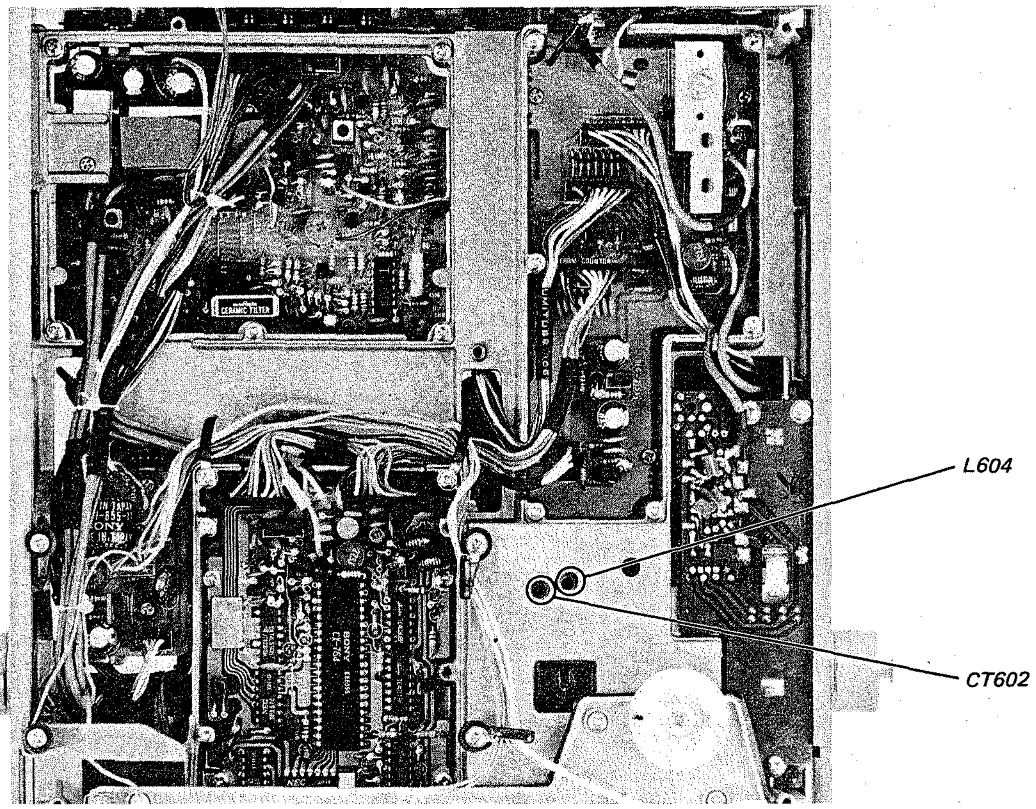
When using a frequency counter, adjust for the following specification.

When the TUNING knob is turned fully counterclockwise:

12,500 MHz±0.5 kHz CT602

When the TUNING knob is turned fully clockwise:

12,390 MHz±0.5 kHz L604



VCO Frequency Coverage Adjustment

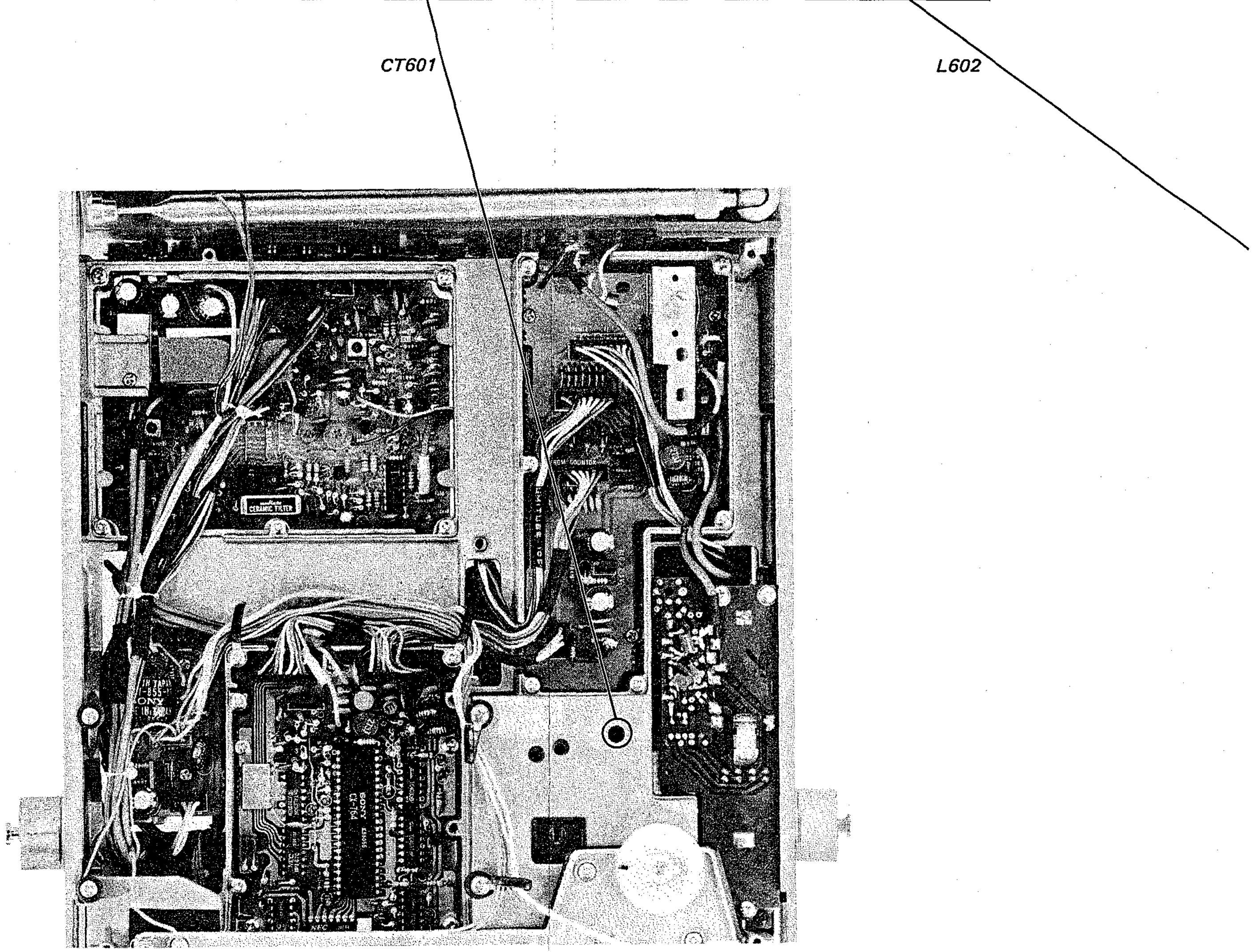
Simple Way

1. Pull the TUNING knob and turn fully clockwise.
2. Adjust CT601 to obtain 30.850 digital frequency display.
3. Turn the TUNING knob to obtain 30.000 digital frequency display.
4. Adjust the dial pointer so that it points 30 MHz.
5. Next, turn the TUNING knob counterclockwise and set the dial pointer at "0".
6. Turn the core of L602 so that the digital frequency display shows "000".
7. Turn the TUNING knob further counterclockwise. Confirm that the dial pointer moves more than 7 mm left from "0".
8. Turn the TUNING knob and set the dial pointer at 30 MHz. Confirm that the digital frequency display shows 30.000.
   When it does not show 30.000, then repeat steps 2 – 8 several times.
   After the adjustment, confirm that the dial pointer and the digital frequency display matches together at 0.5, 5.0, 10, 15, 20, 25.

When using a frequency counter, adjust for the following specification.

fmin 55.292 MHz±20 kHz L602

fmax 86.703 MHz±50 kHz CT601



VCO

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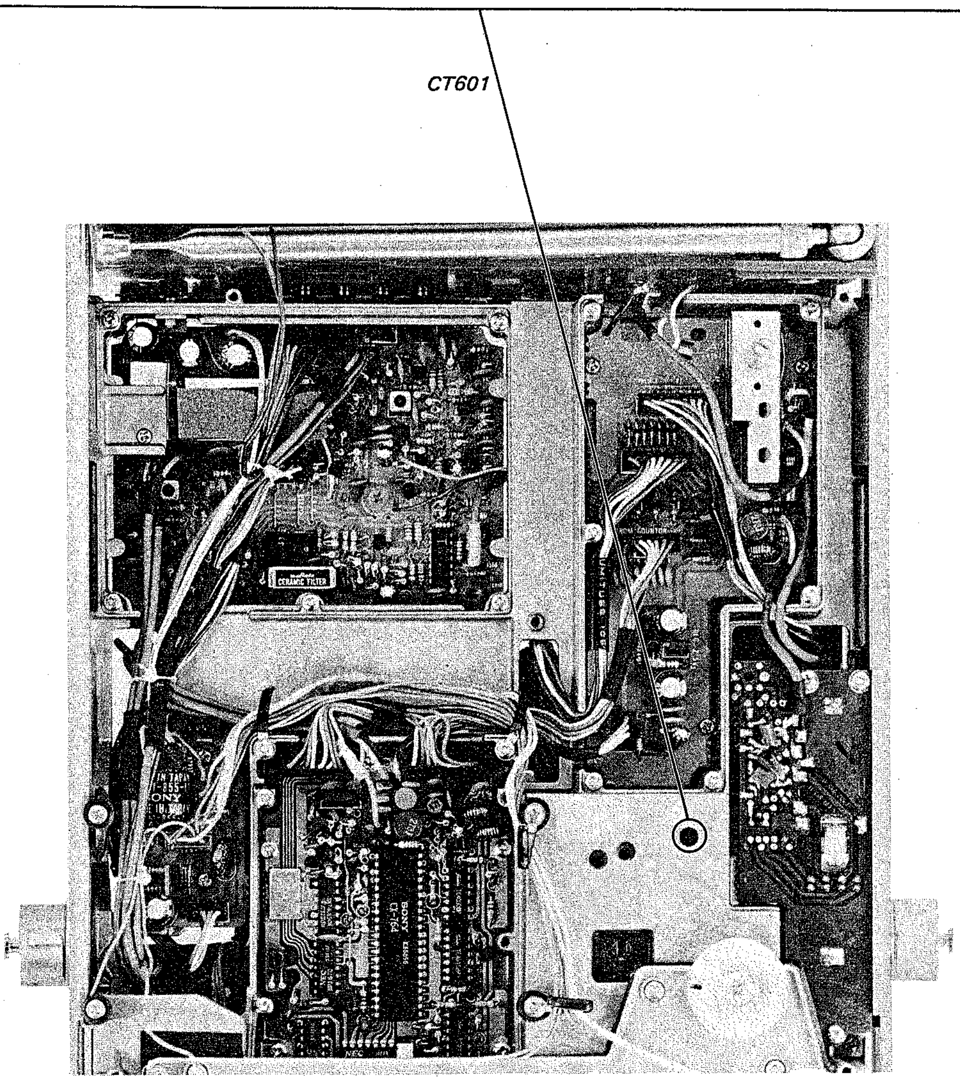
VCO Frequency Coverage Adjustment

Simple Way

1. Pull the TUNING knob and turn fully clockwise.
2. Adjust CT601 to obtain 30.850 digital frequency display.
3. Turn the TUNING knob to obtain 30.000 digital frequency display.
4. Adjust the dial pointer so that it points 30 MHz.
5. Next, turn the TUNING knob counterclockwise and set the dial pointer at "0".
6. Turn the core of L602 so that the digital frequency display shows "000".
7. Turn the TUNING knob further counterclockwise. Confirm that the dial pointer moves more than 7 mm left from "0".
8. Turn the TUNING knob and set the dial pointer at 30 MHz. Confirm that the digital frequency display shows 30.000.
   When it does not show 30.000, then repeat steps 2 – 8 several times.
   After the adjustment, confirm that the dial pointer and the digital frequency display matches together at 0.5, 5.0, 10, 15, 20, 25.

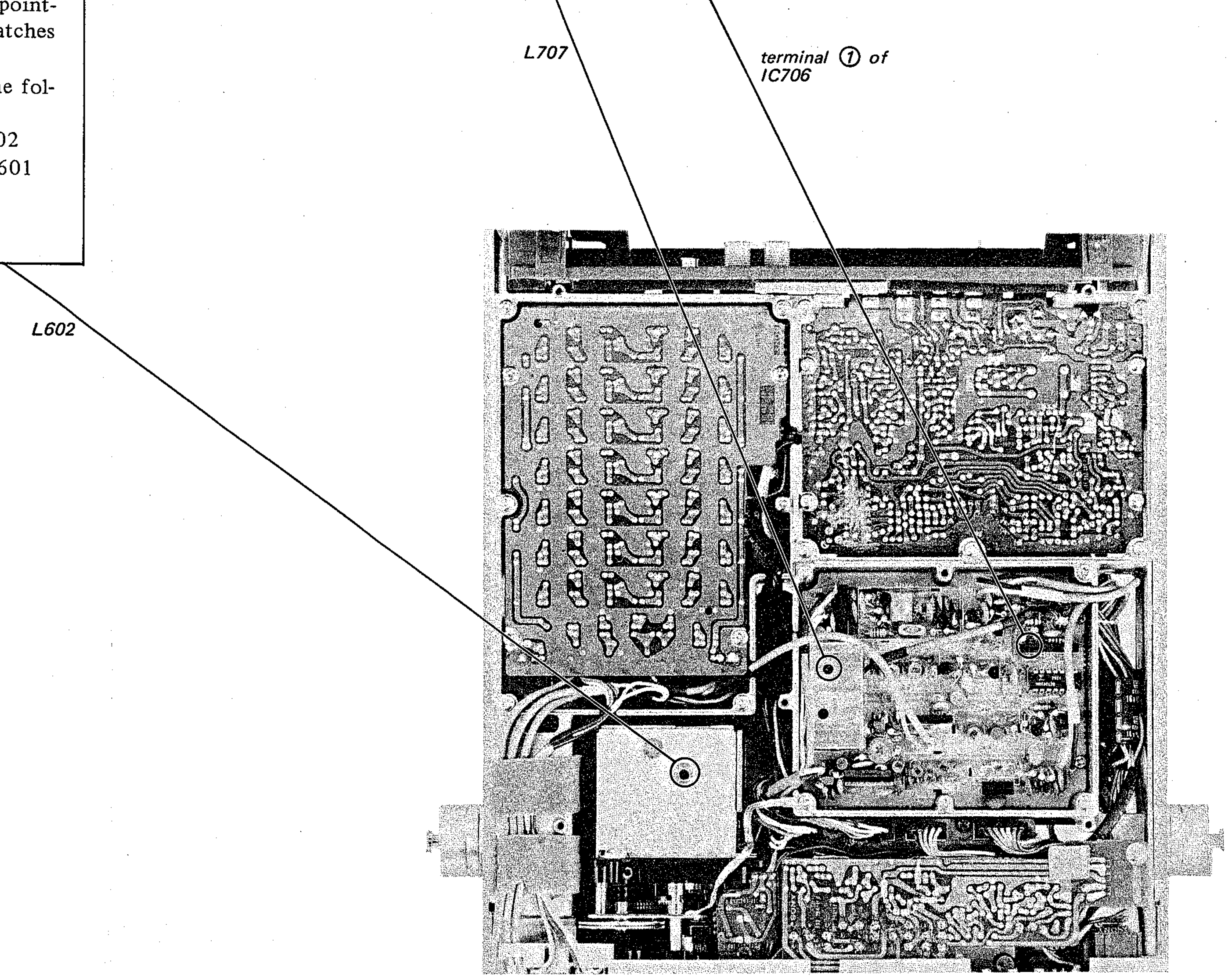
When using a frequency counter, adjust for the following specification.

fmin 55.292 MHz±20 kHz L602
fmax 86.703 MHz±50 kHz CT601



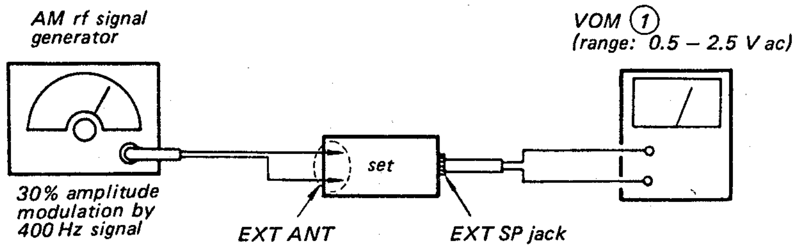
VCO$_2$ Adjustment

1. Push in the TUNING knob and turn it fully counterclockwise.
2. Turn and adjust L707 to obtain 2 V voltage at terminal ① of IC706.
   Specification: 2±0.1 V



IF Adjustment 1

○ ANTENNA SELECTOR . . . . EXT ANT
○ MODE switch . . . . NARROW


AM rf signal generator
VOM ①
(range: 0.5 – 2.5 V ac)
set
30% amplitude modulation by 400 Hz signal
EXT ANT
EXT SP jack

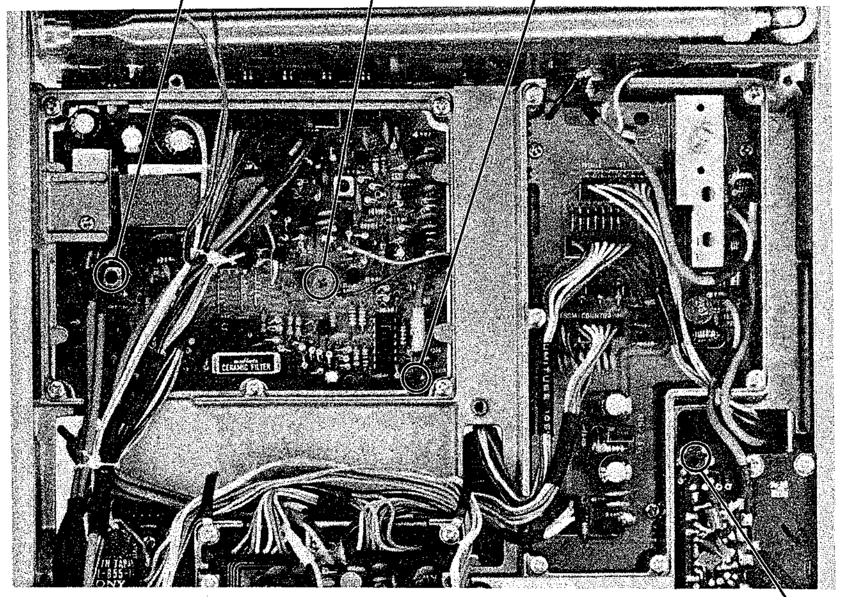
1. Apply a signal from the signal generator and tune in the signal by the TUNING knob. (Apply a signal as weak as possible.)
2. Turn the core of T202 and adjust for the maximum output.
3. Turn T103, 104 and adjust for a clear neat waveform and for the maximum output.
*4. Turn T105 for the maximum output.
5. Repeat steps 3 – 4 several times.

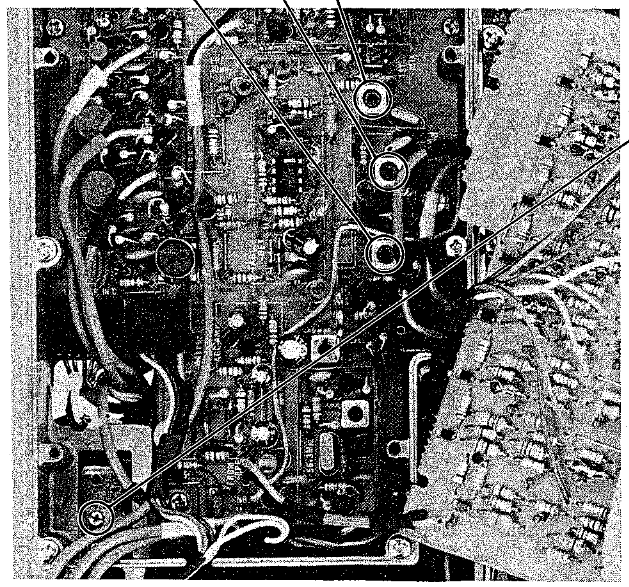
* : Unnecessary for the model that serial No. 10601 and later.

IF Adjustment 2

○ ANTENNA SELECTOR . . . . EXT ANT
○ MODE SELECTOR . . . . NARROW
○ MGC . . . . MAX
○ PRESELECTOR . . . . OUT

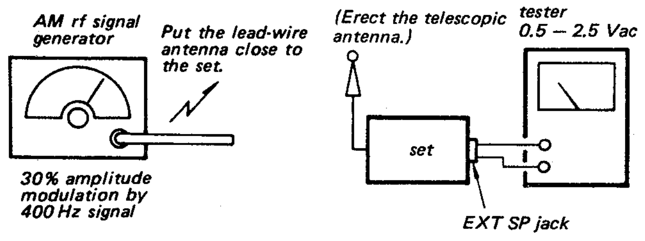
1. Set the PRESELECTOR to "OUT" and apply 10,050.0 MHz, 10 dBμ signal from the signal generator.
2. Tune in the signal by the TUNING knob.
3. Set the PRESELECTOR to "IN" and turn the preselector to obtain the maximum output.
4. Change the signal to 60 dBμ and obtain 0 dB output level by turning the VOLUME knob.
5. Change the output of SSG to 0 dBμ. Turn VR201 and adjust for –6 dB output.
6. Change the output of SSG to 110 dBμ. Turn VR202 and adjust for the point just before the output level drops.


T202
VR202
VR201
L502

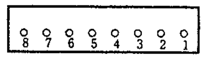

T105
T104
T103
CT501

Preselector Adjustment

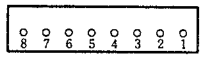
① ○ ANTENNA SELECTOR . .TELESCOPIC ANT
○ MODE SELECTOR . . . . .NARROW
○ PRESELECTOR . . . . . . .IN
○ MGC. . . . . .MAX


AM rf signal generator
Put the lead-wire antenna close to the set.
(Erect the telescopic antenna.)
tester
0.5 – 2.5 Vac
set
30% amplitude modulation by 400 Hz signal
EXT SP jack

1. Apply 145 kHz signal from the sweep generator.
2. Tune in the signal (145 kHz) by the TUNING knob.
3. Turn the PRESELECTOR knob fully counterclockwise.
4. Adjust the core of L502 for the maximum output.
5. Disconnect the 8 pin connector which is connecting the counter board and the antenna board.



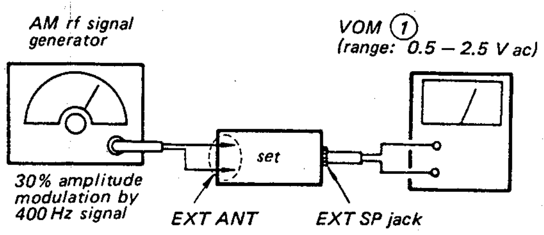
connector from the counter board Ⓐ



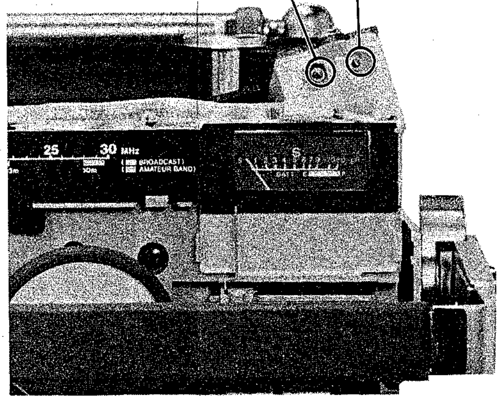
connector to the antenna board Ⓑ

6. Apply 410 kHz signal from the sweep generator.
7. Connect terminal 2 of connector Ⓐ and terminal 1 of connector Ⓑ with a lead wire.
8. Tune in 410 kHz signal with the TUNING knob.
9. Turn the PRESELECTOR knob fully clockwise.
10. Adjust CT501 for the maximum output.
11. Repeat steps 1 – 10 and adjust correctly.

② ○ ANTENNA SELECTOR . . . . EXT ANT
○ MODE SELECTOR . . . . NARROW
○ PRESELECTOR . . . . IN
○ MGC . . . . MAX


AM rf signal generator
VOM ①
(range: 0.5 – 2.5 V ac)
set
30% amplitude modulation by 400 Hz signal
EXT ANT
EXT SP jack

1. Connect terminal 1 of connector Ⓐ and terminal 2 of connector Ⓑ.
2. Apply 385 kHz signal from the sweep generator.
3. Tune in the signal (385 kHz) by turning the TUNING knob.
4. Turn the shaft of the PRESELECTOR fully counterclockwise.
5. Adjust L501-1 for the maximum output.
6. Next, connect terminal 5 of connector Ⓐ and terminal 6 of connector Ⓑ.
7. Apply 3.8 MHz signal from the sweep generator.
8. Tune in 3.8 MHz signal by turning the TUNING knob.
9. Turn the shaft of the PRESELECTOR fully counterclockwise.
10. Adjust L501-2 for the maximum output.


L501-2
L501-1

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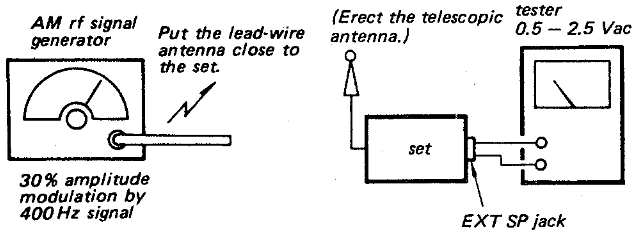
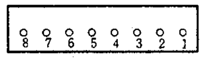
Preselector Adjustment

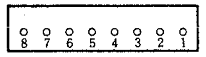
① ○ ANTENNA SELECTOR . . .TELESCOPIC ANT
○ MODE SELECTOR . . . . .NARROW
○ PRESELECTOR . . . . . . .IN
○ MGC. . . . . .MAX


AM rf signal generator
Put the lead-wire antenna close to the set.
30% amplitude modulation by 400 Hz signal
(Erect the telescopic antenna.)
tester 0.5 – 2.5 Vac
set
EXT SP jack

1. Apply 145 kHz signal from the sweep generator.
2. Tune in the signal (145 kHz) by the TUNING knob.
3. Turn the PRESELECTOR knob fully counterclockwise.
4. Adjust the core of L502 for the maximum output.
5. Disconnect the 8 pin connector which is connecting the counter board and the antenna board.



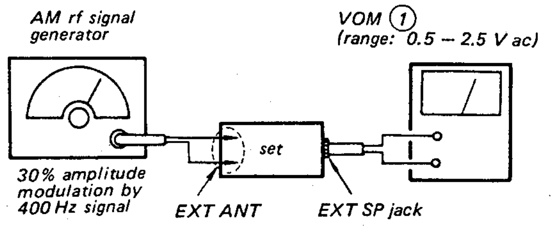
connector from the counter board Ⓐ



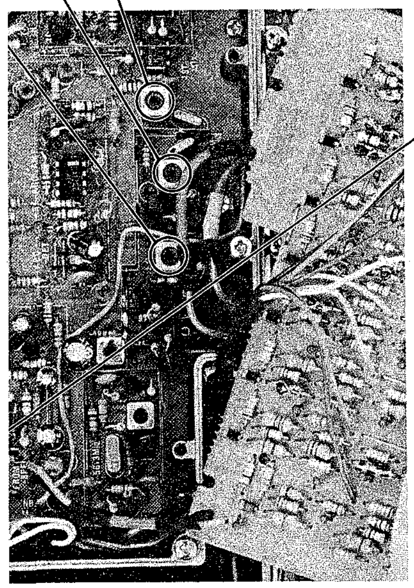
connector to the antenna board Ⓑ

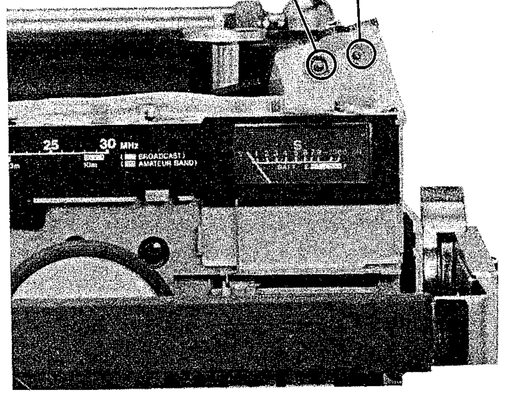
6. Apply 410 kHz signal from the sweep generator.
7. Connect terminal 2 of connector Ⓐ and terminal 1 of connector Ⓑ with a lead wire.
8. Tune in 410 kHz signal with the TUNING knob.
9. Turn the PRESELECTOR knob fully clockwise.
10. Adjust CT501 for the maximum output.
11. Repeat steps 1 – 10 and adjust correctly.

② ○ ANTENNA SELECTOR . . . . EXT ANT
○ MODE SELECTOR . . . . NARROW
○ PRESELECTOR . . . . IN
○ MGC . . . . MAX


AM rf signal generator
30% amplitude modulation by 400 Hz signal
set
EXT ANT
EXT SP jack
VOM ① (range: 0.5 – 2.5 V ac)

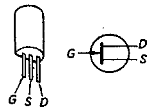
1. Connect terminal 1 of connector Ⓐ and terminal 2 of connector Ⓑ.
2. Apply 385 kHz signal from the sweep generator.
3. Tune in the signal (385 kHz) by turning the TUNING knob.
4. Turn the shaft of the PRESELECTOR fully counterclockwise.
5. Adjust L501-1 for the maximum output.
6. Next, connect terminal 5 of connector Ⓐ and terminal 6 of connector Ⓑ.
7. Apply 3.8 MHz signal from the sweep generator.
8. Tune in 3.8 MHz signal by turning the TUNING knob.
9. Turn the shaft of the PRESELECTOR fully counterclockwise.
10. Adjust L501-2 for the maximum output.


T103
CT501
L502

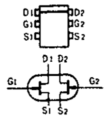

L501-2
L501-1

Replacement Semiconductors

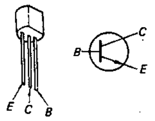
Q101, 102 / Q111, 601 / Q604, 706 : 2SK43
Q103–108 : 2SK152



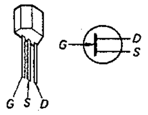
Q109: 2SK58


D1 D2
G1 G2
S1 S2
D1 D2
G1 G2
S1 S2

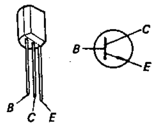
Q110, 115 / Q118, 602 / Q603, 605 / Q703–705 / Q709–713 / Q801, 803 : 2SC930D



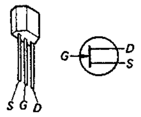
Q112, 119 / Q701, 707 / Q708 : 2SK42



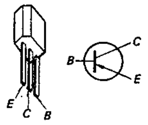
Q113, 114 / Q201–204 / Q208–214 : 2SC710



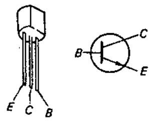
Q116, 117 / Q210 : 2SK23



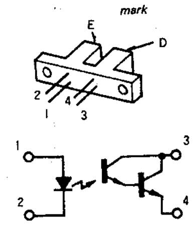
Q120, 121 / Q206 / Q219, 220 / Q409 / Q501–508 / Q811 : 2SA1026



Q122 / Q205, 207 / Q215–217 / Q401–404 / Q408 / Q509, 510 / Q804–806 / Q809, 810 / Q221 : 2SC1363



Q406: PS4001


mark
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1 3
1
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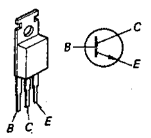
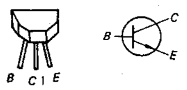
4

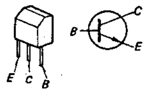
Q407: 2SC1173



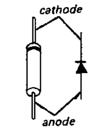
Q702: 2SC668SP



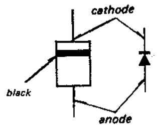
Q802: 2SC641



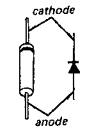
D1–5 / D111–113 / D807, / D901, 902 : 10E2


cathode
anode

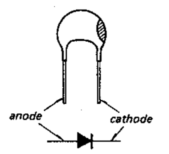
D6–16 / D105–108 / D501–506 : 1S2222


cathode
black
anode

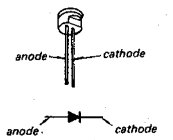
D101–103 / D109, 110 / D114–116 / D201–212 / D406, 409 / D514–523 / D603, 604 / D702 / D801–806 / D814, 815 : 1S1555


cathode
anode

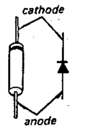
D213: VD1221


anode
cathode

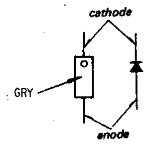
D401–405 / D407 : SLP24B


anode
cathode
anode
cathode

D408: RD9.1E

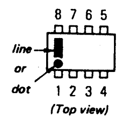

cathode
anode

D601, 602 / D701 : 1T25

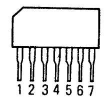

cathode
GRY
anode

4-1. MOUNTING DIAGRAM (US, AEP, E MODEL)
up to Serial No. 10600

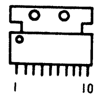
IC101: LA1222


8 7 6 5
line or dot
1 2 3 4
(Top view)

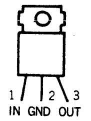
IC202, 701 IC703, 704 } : μPC1037



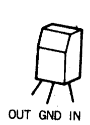
IC203: μPC1154



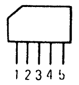
IC204: μPC14305


1 2 3
IN GND OUT

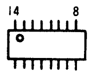
IC501: μPC78L05A



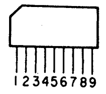
IC702, 801: TA7060



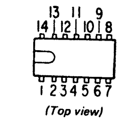
IC705: MB84013M



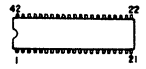
IC706: TC5081P



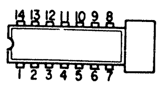
IC802: SN74LS90


13 11 9
14 12 10 8
1 2 3 4 5 6 7
(Top view)

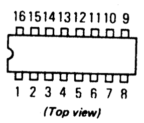
IC803: CX764



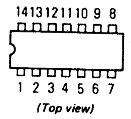
IC804: μPA57C


14 13 12 11 10 9 8
1 2 3 4 5 6 7

IC805: μPA56C

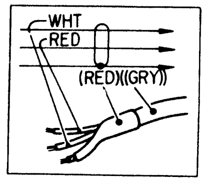

16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

IC201: TA7158
IC806: μPA67C
IC807: TC4001
IC808: TC4011
IC809: TC4030


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

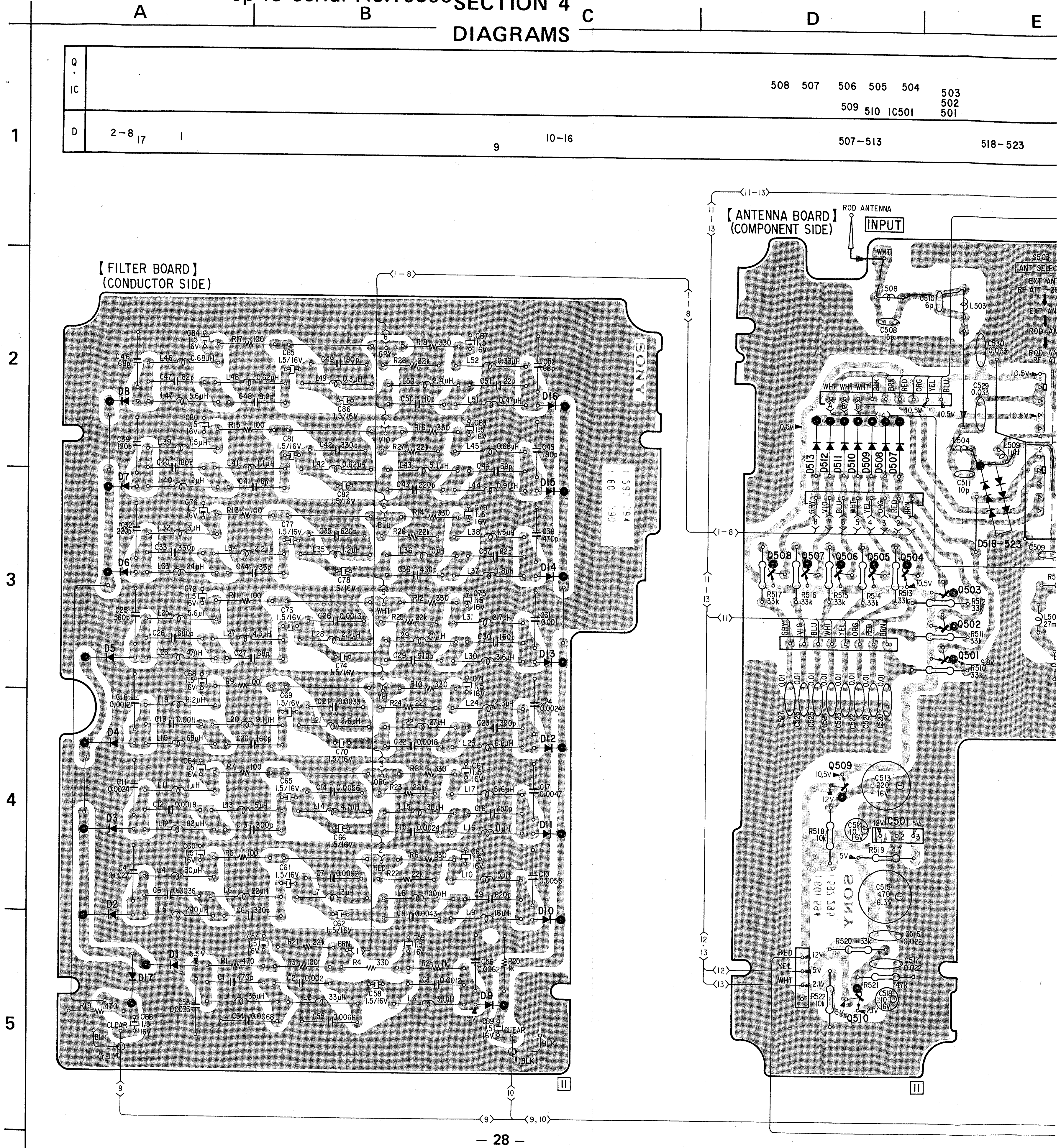
Note:

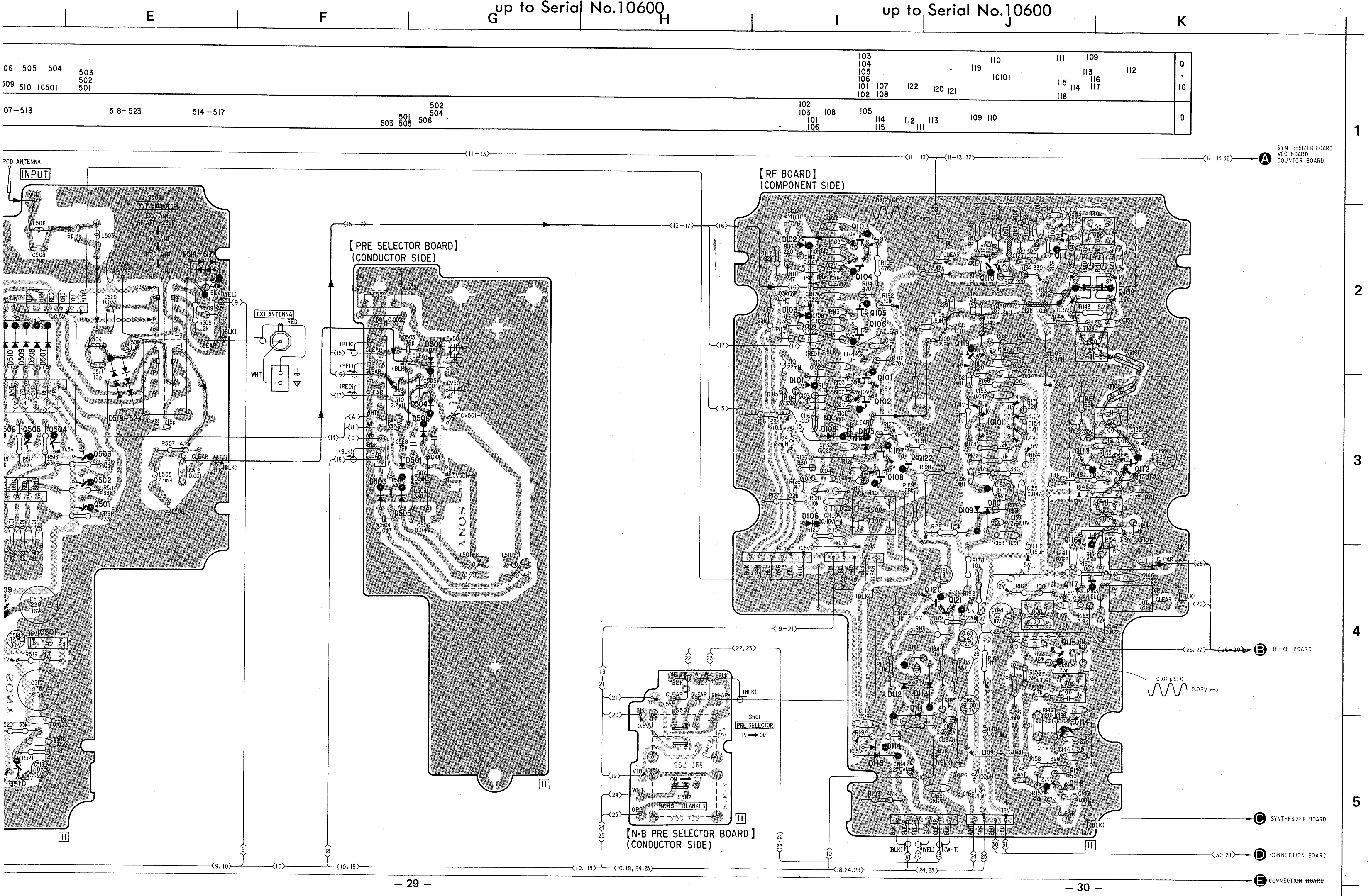
- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

- [⁝]← : indicates side identified with part number.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ▨ : B + pattern
- ● ▬▶▬ : signal path

SECTION 4
DIAGRAMS

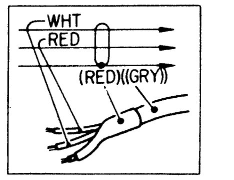

A
B
C
D
E
1
2
3
4
5
Q · IC
D
508 507 506 505 504 503 502 501
509 510 IC501
2–8 17 1 9 10–16 507–513 518–523
【FILTER BOARD】
(CONDUCTOR SIDE)
SONY
D8
D7
D6
D5
D4
D3
D2
D1
D17
D16
D15
D14
D13
D12
D11
D10
D9
CLEAR
BLK
(YEL)
(BLK)
〈1–8〉
〈9〉
〈9, 10〉
〈11〉
〈12〉
〈13〉
〈11–13〉
【ANTENNA BOARD】
(COMPONENT SIDE)
ROD ANTENNA
INPUT
S503
ANT SELECT
EXT ANT
RF ATT
ROD ANT
Q508 Q507 Q506 Q505 Q504
Q503
Q502
Q501
Q509
Q510
IC501
D513 D512 D511 D510 D509 D508 D507
D518–523
GRY VIO BLU WHT YEL ORG RED BRN
WHT WHT WHT BLK BRN RED ORG YEL BLU
RED
YEL
WHT
12V
5V
10.5V


E
F
G
H
I
J
K
1
2
3
4
5
ROD ANTENNA
INPUT
S503
ANT SELECTOR
EXT ANT RF ATT -26dB
EXT ANT
ROD ANT
ROD ANT RF ATT
EXT ANTENNA
【PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
【RF BOARD】
(COMPONENT SIDE)
0.02μSEC
0.05Vp-p
0.02μSEC
0.08Vp-p
【N·B PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
S501
PRE SELECTOR
IN → OUT
S502
NOISE BLANKER
ON → OFF
SONY
Ⓐ SYNTHESIZER BOARD VCO BOARD COUNTOR BOARD
Ⓑ IF-AF BOARD
Ⓒ SYNTHESIZER BOARD
Ⓓ CONNECTION BOARD
Ⓔ CONNECTION BOARD

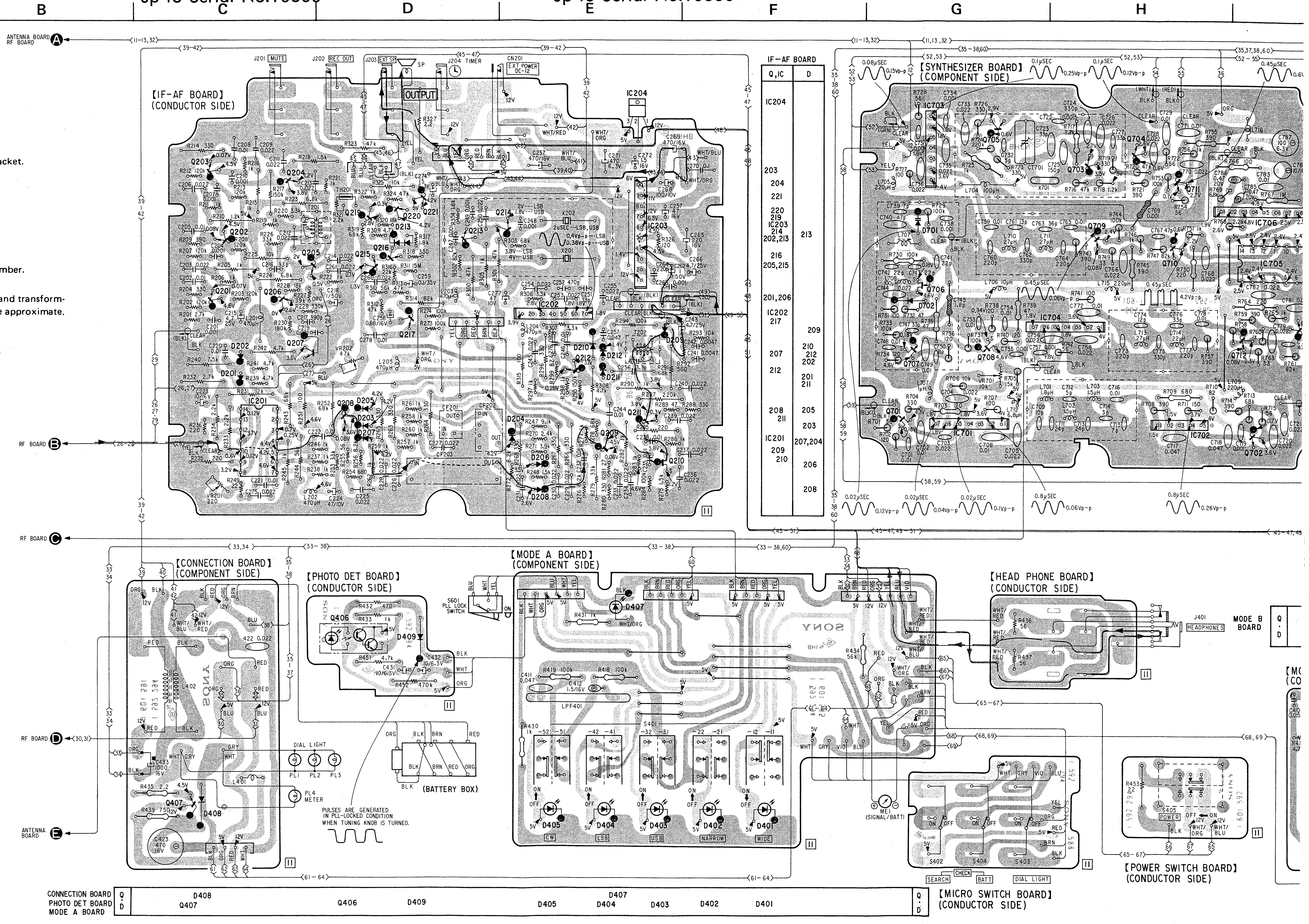
4-2. MOUNTING DIAGRAM (US, AEP, E MODEL)
up to Serial No. 10600

Note:

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)(GRY)

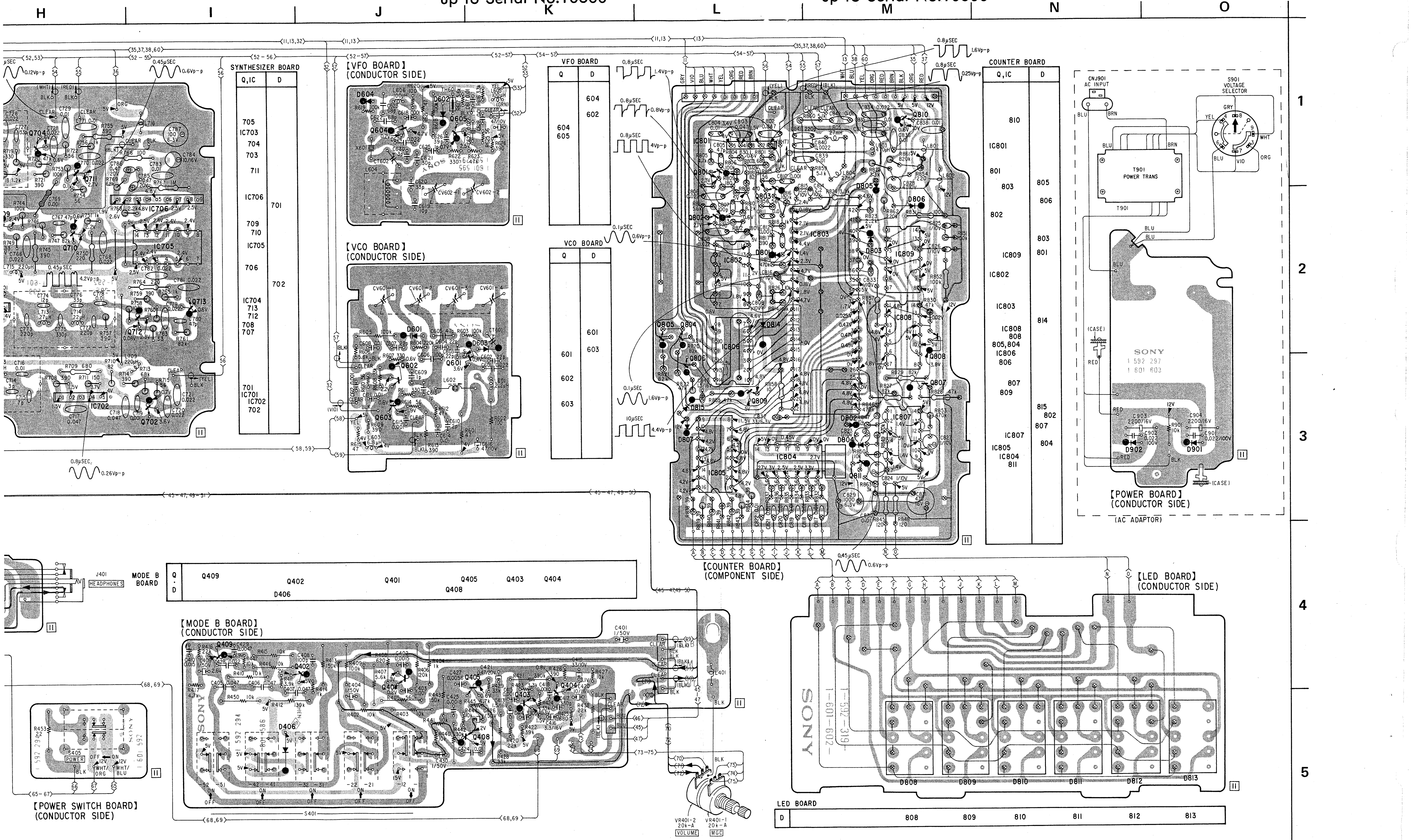
- [ ] : indicates side identified with part number.
- ⊗ : Through hole.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ▨ : B + pattern
- ━━▶━ : signal path
- ⊗—⊗ : component-side pattern.


A
B
C
D
E
F
G
H
ANTENNA BOARD A
RF BOARD
RF BOARD B
RF BOARD C
RF BOARD D
ANTENNA BOARD E
[IF-AF BOARD] (CONDUCTOR SIDE)
J201 MUTE
J202 REC OUT
J203 EXT SP
SP
J204 TIMER
CN201 EXT POWER DC-12
OUTPUT
IC204
IC203
IC202
IC201
SONY
[SYNTHESIZER BOARD] (COMPONENT SIDE)
IC703
IC706
IC705
IC704
IC701
IC702
X701
0.08μSEC 0.15Vp-p
0.1μSEC 0.25Vp-p
0.1μSEC 0.12Vp-p
0.45μSEC
0.02μSEC 0.12Vp-p
0.02μSEC 0.04Vp-p
0.02μSEC 0.1Vp-p
0.8μSEC 0.06Vp-p
0.8μSEC 0.26Vp-p
[CONNECTION BOARD] (COMPONENT SIDE)
[PHOTO DET BOARD] (CONDUCTOR SIDE)
[MODE A BOARD] (COMPONENT SIDE)
[HEAD PHONE BOARD] (CONDUCTOR SIDE)
J401 HEADPHONES
MODE B BOARD
S601 PLL LOCK SWITCH
DIAL LIGHT
PL1 PL2 PL3
PL4 METER
(BATTERY BOX)
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
LPF401
S401
CW
LSB
USB
NARROW
WIDE
D405 D404 D403 D402 D401
ME1 (SIGNAL/BATT)
[MICRO SWITCH BOARD] (CONDUCTOR SIDE)
S402 S404 S403
SEARCH CHECK BATT DIAL LIGHT
S405 POWER
[POWER SWITCH BOARD] (CONDUCTOR SIDE)

IF-AF BOARD

Q,IC	D
IC204	
203	
204	
221	
220	
219	
IC203	
214	213
202,213	
216	
205,215	
201,206	
IC202	
217	
	209
	210
207	212
	202
212	
	201
	211
208	205
211	
	203
IC201	207,204
209	
210	206
	208

CONNECTION BOARD PHOTO DET BOARD MODE A BOARD	Q D									
	Q	D408				D407				
	D	Q407	Q406	D409	D405	D404	D403	D402	D401	

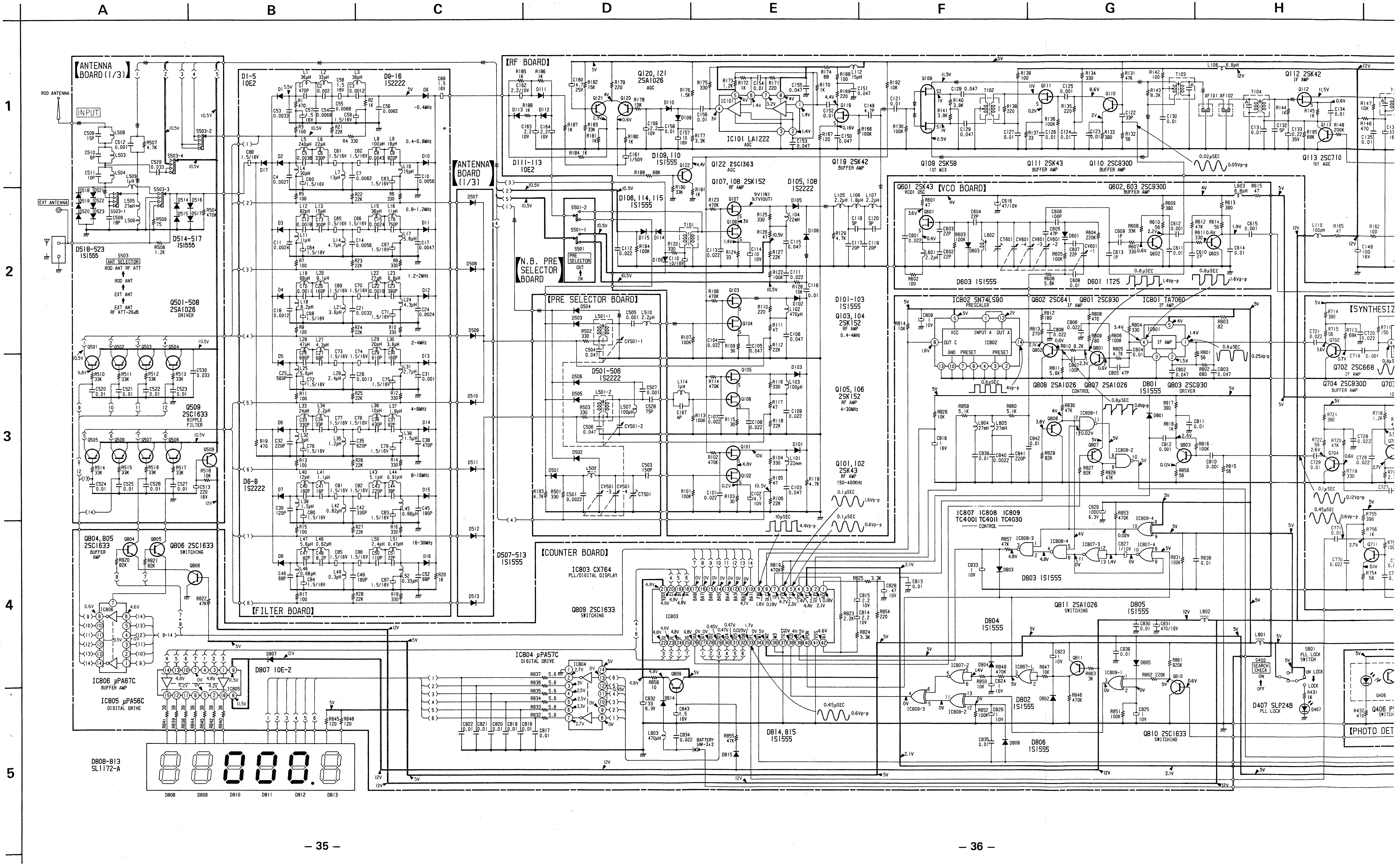

H
I
J
K
L
M
N
O
1
2
3
4
5
SYNTHESIZER BOARD
Q,IC: 705, IC703, 704, 703, 711, IC706, 709, 710, IC705, 706, IC704, 713, 712, 708, 707, 701, IC701, IC702, 702
D: 701, 702
【VFO BOARD】
(CONDUCTOR SIDE)
VFO BOARD
Q: 604, 605
D: 604, 602
【VCO BOARD】
(CONDUCTOR SIDE)
VCO BOARD
Q: 601, 602, 603
D: 601, 603
COUNTER BOARD
Q,IC: 810, IC801, 801, 803, 802, IC809, IC802, IC803, IC808, 808, 805,804, IC806, 806, 807, 809, IC807, IC805, IC804, 811
D: 805, 806, 803, 801, 814, 815, 802, 807, 804
【COUNTER BOARD】
(COMPONENT SIDE)
CNJ901 AC INPUT
S901 VOLTAGE SELECTOR
T901 POWER TRANS
【POWER BOARD】
(CONDUCTOR SIDE)
(AC ADAPTOR)
【LED BOARD】
(CONDUCTOR SIDE)
LED BOARD
D: 808, 809, 810, 811, 812, 813
MODE B BOARD
Q: Q409, Q402, Q401, Q405, Q403, Q404
D: D406, Q408
【MODE B BOARD】
(CONDUCTOR SIDE)
J401 HEADPHONES
S401
【POWER SWITCH BOARD】
(CONDUCTOR SIDE)
S405 POWER
VR401-2 20k-A VOLUME
VR401-1 20k-A MGC
0.8μSEC
0.45μSEC
0.1μSEC
10μSEC
1.6Vp-p
0.25Vp-p
4Vp-p
4.4Vp-p
0.26Vp-p
SONY

4-3. SCHEMATIC DIAGRAM (US, AEP, E MODEL)
up to Serial No. 10600

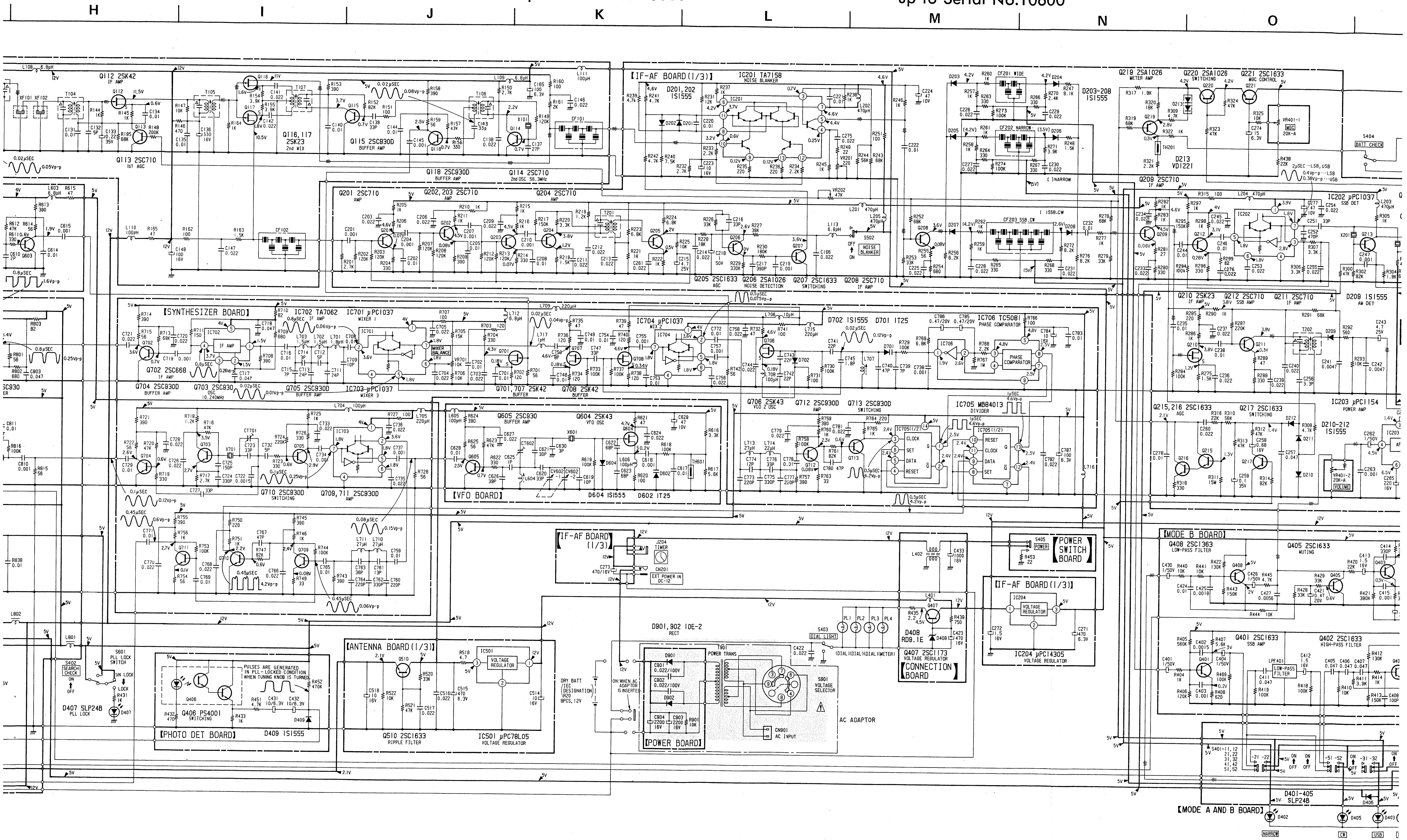
AEP, US, E MODEL
up to Serial No.10600

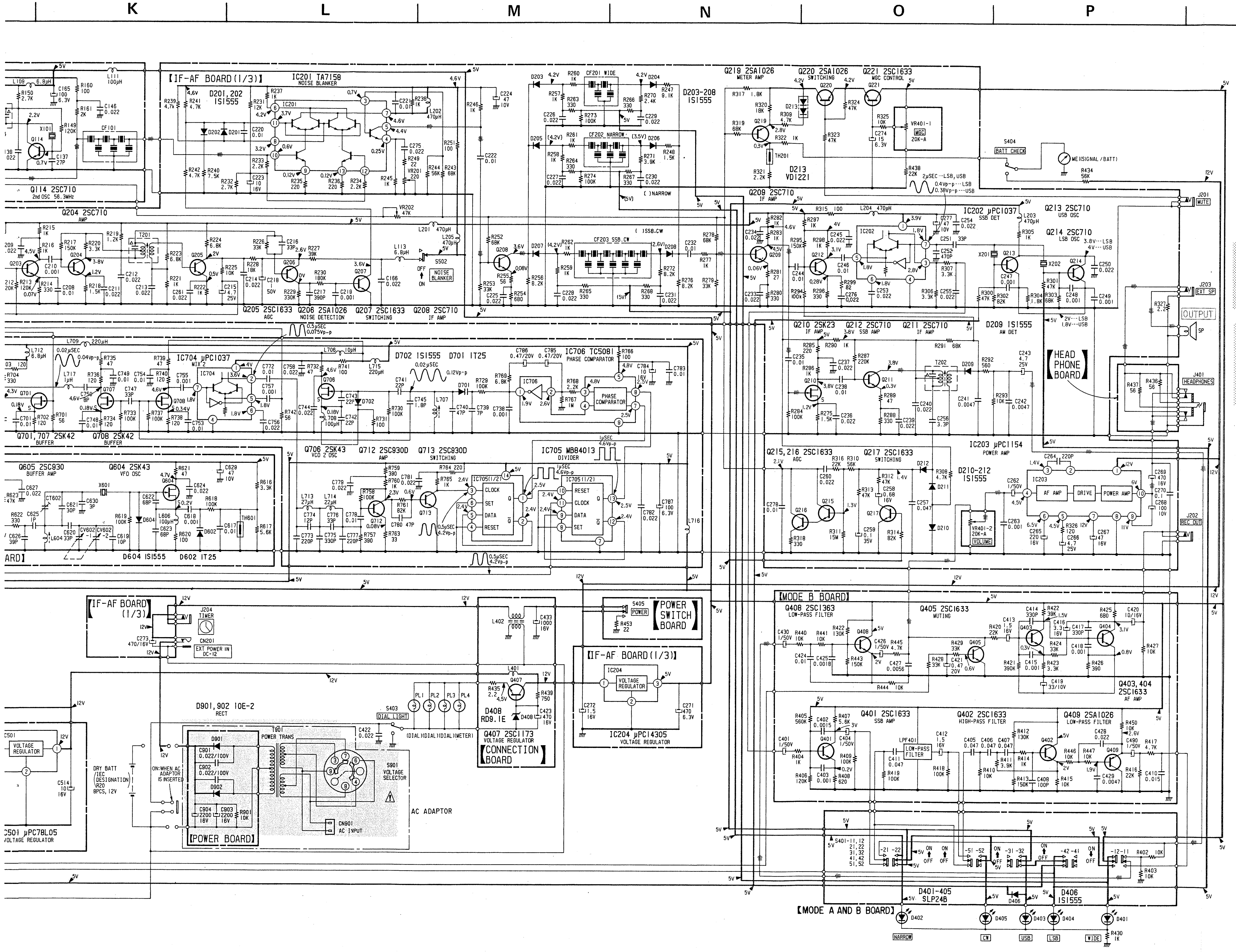
CRF-1 CRF-1

AEP, US, E MODEL
up to Serial No.10600



A
B
C
D
E
F
G
H
1
2
3
4
5
ROD ANTENNA
EXT ANTENNA
[ANTENNA BOARD (1/3)]
INPUT
D518-523 1S1555
S503 ANT SELECTOR
ROD ANT RF ATT
ROD ANT
EXT ANT
EXT ANT RF ATT-26dB
Q501-508 2SA1026 DRIVER
D514-517 1S1555
Q509 2SC1633 RIPPLE FILTER
Q804, 805 2SC1633 BUFFER AMP
Q806 2SC1633 SWITCHING
IC806 μPA67C BUFFER AMP
IC805 μPA56C DIGITAL DRIVE
D808-813 SL1172-A
D807 10E-2
D1-5 10E2
D9-16 1S2222
D6-8 1S2222
[FILTER BOARD]
0.4-0.8MHz
0.8-1.2MHz
1.2-2MHz
2-4MHz
4-8MHz
8-16MHz
16-30MHz
[ANTENNA BOARD (1/3)]
D507-513 1S1555
[RF BOARD]
Q120, 121 2SA1026 AGC
IC101 LA1222 AGC
Q119 2SK42 BUFFER AMP
Q122 2SC1363 AGC
Q107, 108 2SK152 RF AMP
D105, 108 1S2222
D109, 110 1S1555
D111-113 10E2
D106, 114, 115 1S1555
[N.B. PRE SELECTOR BOARD]
[PRE SELECTOR BOARD]
D501-506 1S2222
D101-103 1S1555
Q103, 104 2SK152 RF AMP 0.4-4MHz
Q105, 106 2SK152 RF AMP 4-30MHz
Q101, 102 2SK43 RF AMP 150-400KHz
[COUNTER BOARD]
IC803 CX764 PLL/DIGITAL DISPLAY
Q809 2SC1633 SWITCHING
IC804 μPA57C DIGITAL DRIVE
D814, 815 1S1555
Q109 2SK58 1st MIX
Q111 2SK43 BUFFER AMP
Q110 2SC930D BUFFER AMP
Q112 2SK42 IF AMP
Q113 2SC710 1st AGC
Q601 2SK43 VCO1 OSC
[VCO BOARD]
Q602, 603 2SC930D BUFFER AMP
D603 1S1555
D601 1T25
IC802 SN74LS90 PRESCALER
Q802 2SC641 IF AMP
Q801 2SC930 IF AMP
IC801 TA7060 IF AMP
Q808 2SA1026
Q807 2SA1026 CONTROL
D801 1S1555
Q803 2SC930 DRIVER
IC807 IC808 IC809 TC4001 TC4011 TC4030 CONTROL
D803 1S1555
Q811 2SA1026 SWITCHING
D805 1S1555
D804 1S1555
D802 1S1555
D806 1S1555
Q810 2SC1633 SWITCHING
S601 PLL LOCK SWITCH
S402 SEARCH CHECK
D407 SLP24B PLL LOCK
[SYNTHESIZ
Q702 2SC668 IF AMP
Q704 2SC930D BUFFER AMP
Q406 SWITCH
[PHOTO DET


H
I
J
K
L
M
N
O
Q112 2SK42 IF AMP
Q113 2SC710 1st AGC
Q116, 117 2SK23 2nd MIX
Q115 2SC930D BUFFER AMP
Q118 2SC930D BUFFER AMP
Q114 2SC710 2nd OSC 56.3MHz
【IF-AF BOARD (1/3)】
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
D203-208 1S1555
Q219 2SA1026 METER AMP
Q220 2SA1026 SWITCHING
Q221 2SC1633 MGC CONTROL
CF201 WIDE
CF202 NARROW
CF203 SSB.CW
Q201 2SC710 AMP
Q202, 203 2SC710 AMP
Q204 2SC710 AMP
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
Q209 2SC710 IF AMP
IC202 µPC1037 SSB DET
D213 VD1221
S404 BATT CHECK
S502 NOISE BLANKER
【SYNTHESIZER BOARD】
IC702 TA7062 IF AMP
IC701 µPC1037 MIXER 1
IC703 µPC1037 MIXER 3
IC704 µPC1037 MIX 2
IC706 TC5081 PHASE COMPARATOR
IC705 MB84013 DIVIDER
D702 1S1555
D701 1T25
Q702 2SC668 IF AMP
Q704 2SC930D BUFFER AMP
Q703 2SC930 OSC 10.240MHz
Q705 2SC930D BUFFER AMP
Q701, 707 2SK42 BUFFER
Q708 2SK42 BUFFER
Q706 2SK43 VCO 2 OSC
Q712 2SC930D AMP
Q713 2SC930D SWITCHING
Q710 2SC930D SWITCHING
Q709, 711 2SC930D AMP
【VFO BOARD】
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
D604 1S1555
D602 1T25
Q210 2SK23 IF AMP
Q212 2SC710 SSB AMP
Q211 2SC710 IF AMP
D209 1S1555 AM DET
Q215, 216 2SC1633 AGC
Q217 2SC1633 SWITCHING
D210-212 1S1555
IC203 µPC1154 POWER AMP
VR401-2 20K-A VOLUME
VR401-1 MGC 20K-A
【IF-AF BOARD (1/3)】
J204 TIMER
CN201 EXT POWER IN DC-12
S405 POWER
【POWER SWITCH BOARD】
【IF-AF BOARD (1/3)】
IC204 VOLTAGE REGULATOR
IC204 µPC14305 VOLTAGE REGULATOR
【MODE B BOARD】
Q408 2SC1363 LOW-PASS FILTER
Q405 2SC1633 MUTING
Q401 2SC1633 SSB AMP
Q402 2SC1633 HIGH-PASS FILTER
S402 SEARCH CHECK
S601 PLL LOCK SWITCH
D407 SLP24B PLL LOCK
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
Q406 PS4001 SWITCHING
D409 1S1555
【PHOTO DET BOARD】
【ANTENNA BOARD (1/3)】
Q510 2SC1633 RIPPLE FILTER
IC501 µPC78L05 VOLTAGE REGULATOR
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
AC ADAPTOR
CN901 AC INPUT
DRY BATT (IEC DESIGNATION R20) 8PCS, 12V
ON: WHEN AC ADAPTOR IS INSERTED
【POWER BOARD】
S403 DIAL LIGHT
PL1 PL2 PL3 PL4
(DIAL)(DIAL)(DIAL)(METER)
D408 RD9.1E
Q407 2SC1173 VOLTAGE REGULATOR
【CONNECTION BOARD】
S401-11, 12, 21, 22, 31, 32, 41, 42, 51, 52
D401-405 SLP24B
【MODE A AND B BOARD】
NARROW
CW
USB


K
L
M
N
O
P
Q
R
1
2
3
4
5
[IF-AF BOARD (1/3)]
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
D203-208 1S1555
CF201 WIDE
CF202 NARROW
CF203 SSB.CW
Q219 2SA1026 METER AMP
Q220 2SA1026 SWITCHING
Q221 2SC1633 MGC CONTROL
VR401-1 MGC 20K-A
D213 VD1221
S404 BATT CHECK
ME (SIGNAL/BATT)
J201 MUTE
Q114 2SC710 2nd OSC 58.3MHz
Q204 2SC710 AMP
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
S502 NOISE BLANKER
Q209 2SC710 IF AMP
IC202 μPC1037 SSB DET
Q213 2SC710 USB OSC
Q214 2SC710 LSB OSC
J203 EXT SP
OUTPUT
SP
Q210 2SK23 IF AMP
Q212 2SC710 SSB AMP
Q211 2SC710 IF AMP
D209 1S1555 AM DET
HEAD PHONE BOARD
J401 HEADPHONES
IC704 μPC1037 MIX 2
D702 1S1555
D701 1T25
IC706 TC5081 PHASE COMPARATOR
Q701, 707 2SK42 BUFFER
Q708 2SK42 BUFFER
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
Q706 2SK43 VCO 2 OSC
Q712 2SC930D AMP
Q713 2SC930D SWITCHING
IC705 MB84013 DIVIDER
D604 1S1555
D602 1T25
Q215, 216 2SC1633 AGC
Q217 2SC1633 SWITCHING
D210-212 1S1555
IC203 μPC1154 POWER AMP
AF AMP
DRIVE
POWER AMP
VR401-2 20K-A VOLUME
J202 REC OUT
[IF-AF BOARD] (1/3)
J204 TIMER
CN201 EXT POWER IN DC-12
S405 POWER
POWER SWITCH BOARD
[IF-AF BOARD (1/3)]
IC204 VOLTAGE REGULATOR
IC204 μPC14305 VOLTAGE REGULATOR
Q407 2SC1173 VOLTAGE REGULATOR
D408 RD9.1E
CONNECTION BOARD
PL1 PL2 PL3 PL4
S403 DIAL LIGHT
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
CN901 AC INPUT
AC ADAPTOR
[POWER BOARD]
DRY BATT /IEC DESIGNATION R20 8PCS, 12V
ON: WHEN AC ADAPTOR IS INSERTED
IC501 μPC78L05 VOLTAGE REGULATOR
[MODE B BOARD]
Q408 2SC1363 LOW-PASS FILTER
Q405 2SC1633 MUTING
Q403, 404 2SC1633 AF AMP
Q401 2SC1633 SSB AMP
Q402 2SC1633 HIGH-PASS FILTER
Q409 2SA1026 LOW-PASS FILTER
LPF401 LOW-PASS FILTER
S401-11, 12 21, 22 31, 32 41, 42 51, 52
D401-405 SLP24B
D406 1S1555
[MODE A AND B BOARD]
NARROW
CW
USB
LSB
WIDE

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- △ : internal component.
- ➡ : signal path
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——: B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).

  [ ] : NARROW
  (·) : SSB. CW
- Voltage variations may be noted due to normal production tolerances.
- Switch

Ref. No.	Switch	Position
S401	MODE	WIDE
S402	SEARCH	OFF
S403	DIAL LIGHT	OFF
S404	BATT METER	METER
S405	POWER	ON
S501	PRE SELECTOR	IN
S502	NOISE BLANKER	ON
S503	ANT SELECTOR	RF ATT –26 dB
S601	PLL LOCK	RELEASED
S901	VOLTAGE SELECTOR	100 V

4-4. SCHEMATIC DIAGRAM (US, AEP, E Canadian MODEL)
Serial No. 10601 and later

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

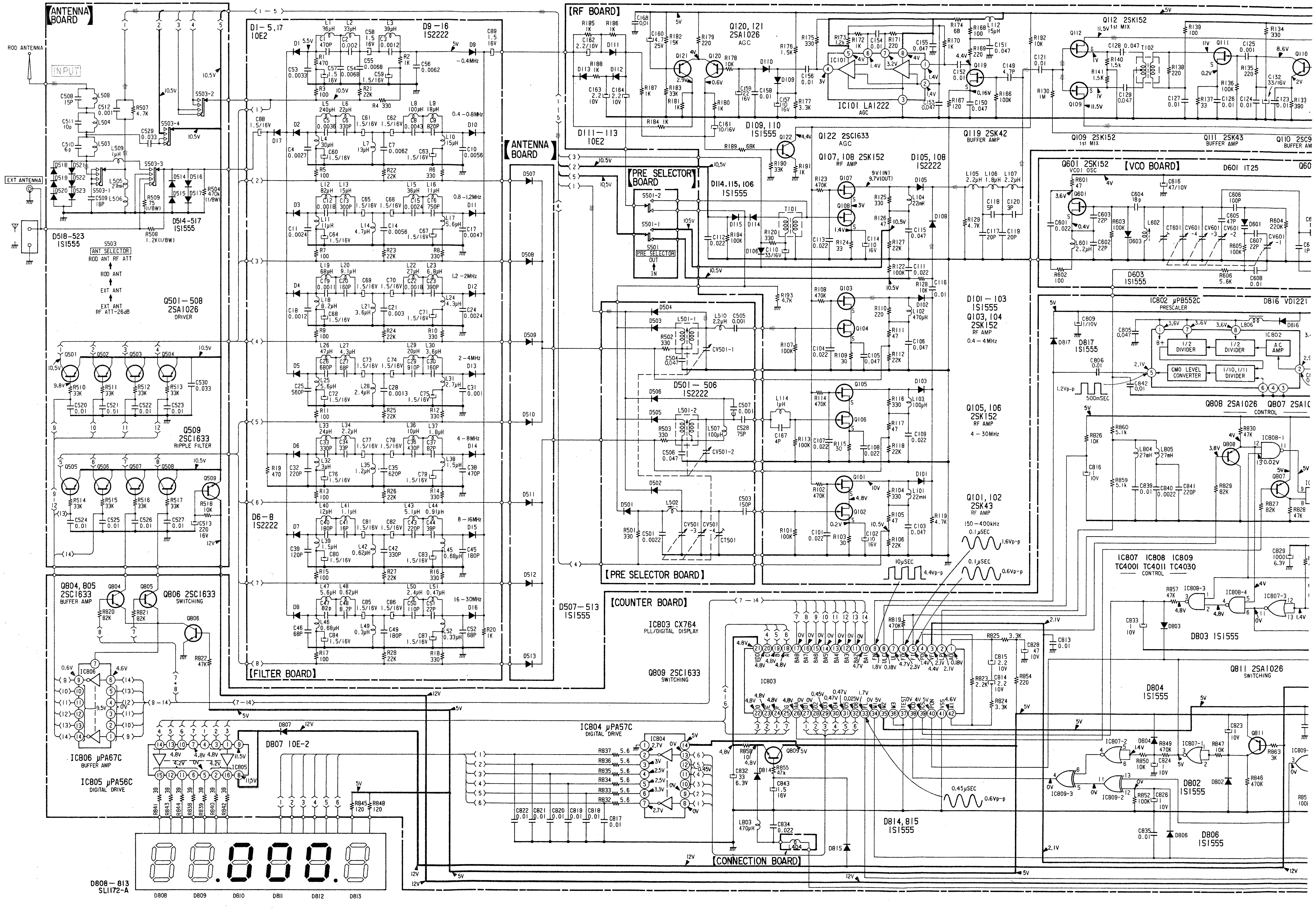
Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

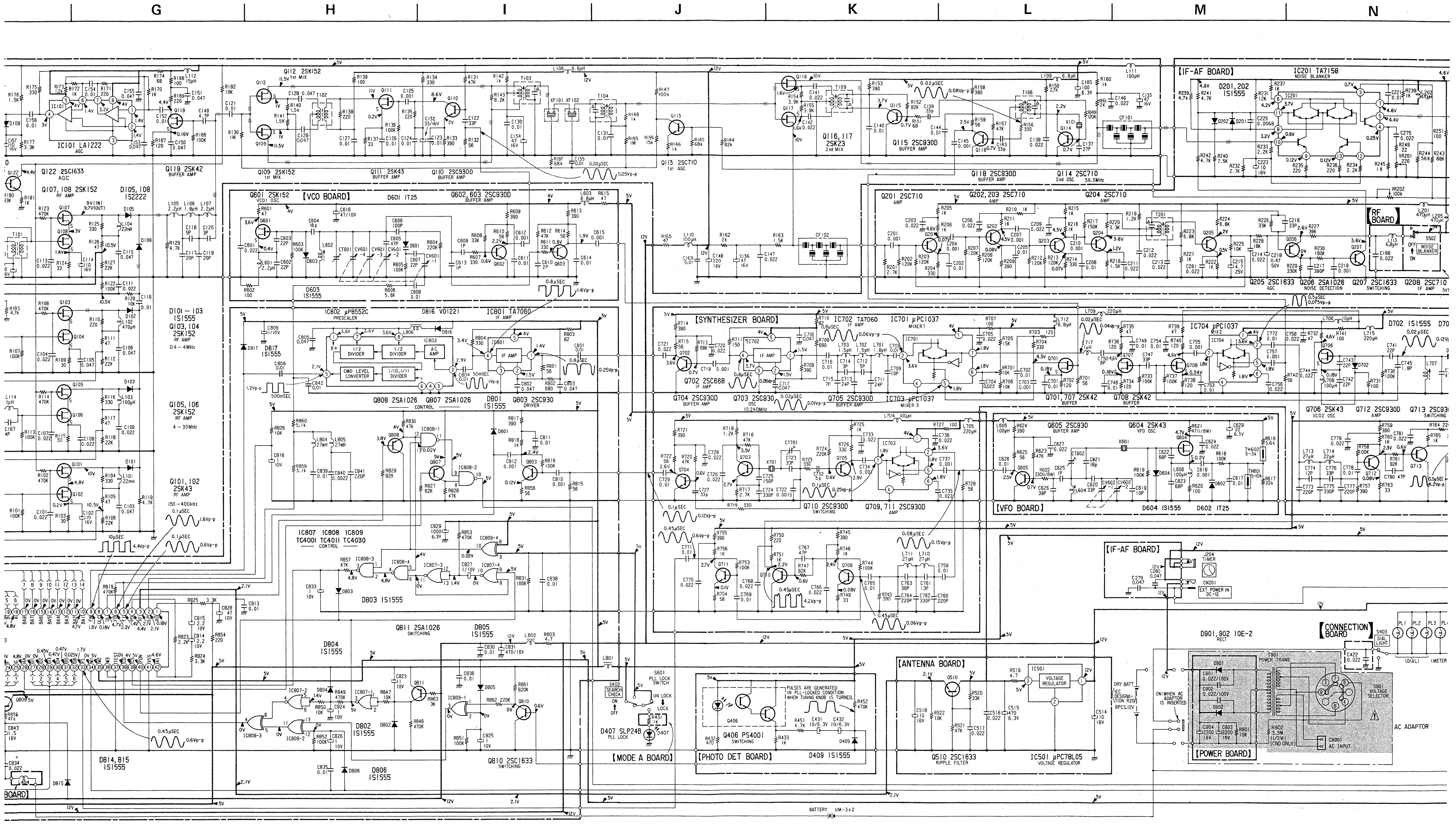
Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- △ : internal component.
- ➡ : signal path
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——— : B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).

  〔 〕 : NARROW
  ( ) : SSB. CW
- Voltage variations may be noted due to normal production tolerances.
- Switch

Ref. No.	Switch	Position
S401	MODE	WIDE
S402	SEARCH	OFF
S403	DIAL LIGHT	OFF
S404	BATT METER	METER
S405	POWER	ON
S501	PRE SELECTOR	IN
S502	NOISE BLANKER	ON
S503	ANT SELECTOR	RF ATT −26 dB
S601	PLL LOCK	RELEASED
S901	VOLTAGE SELECTOR	100 V

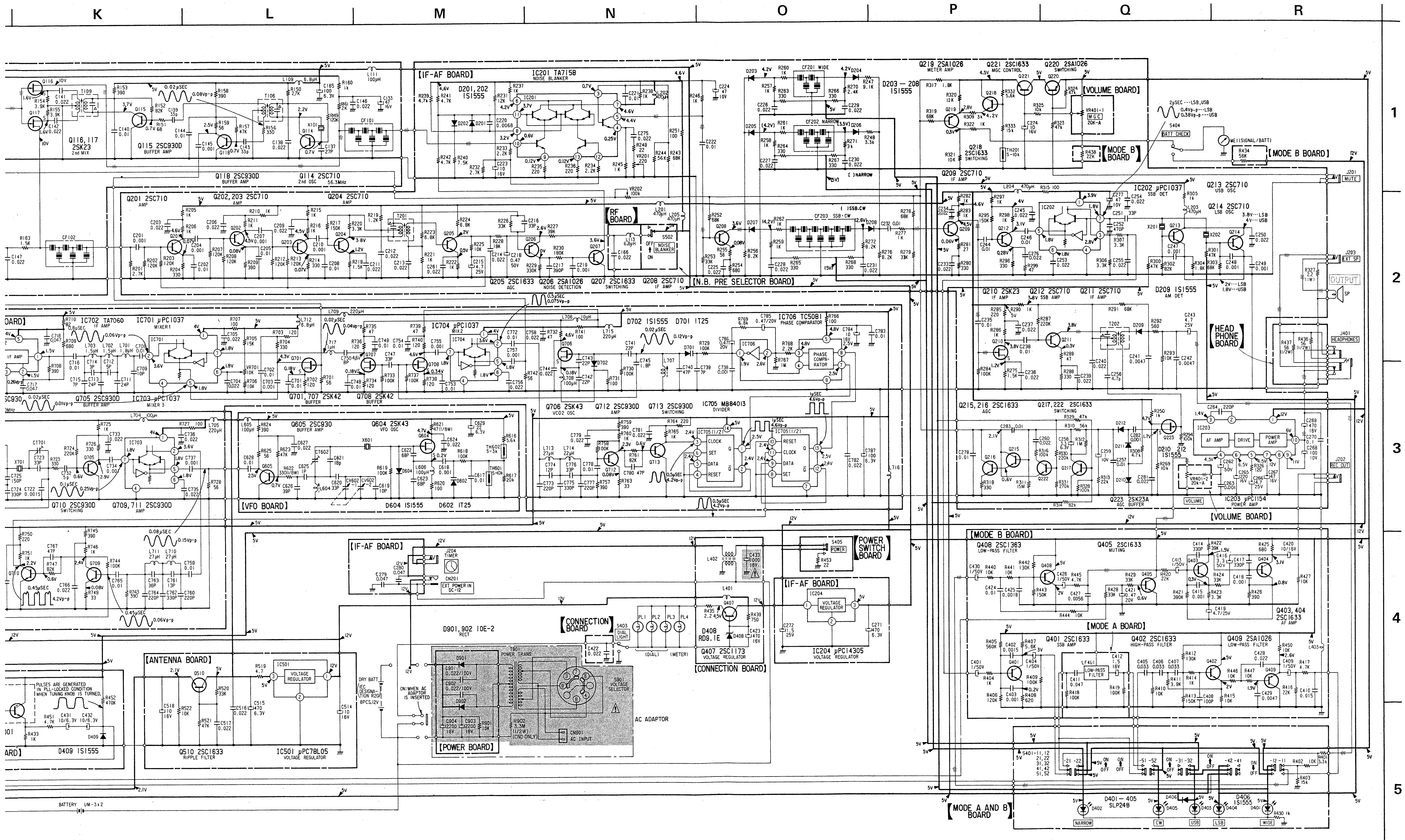

ANTENNA BOARD
ROD ANTENNA
INPUT
EXT ANTENNA
D518–523 1S1555
D514–517 1S1555
S503 ANT SELECTOR
ROD ANT RF ATT
ROD ANT
EXT ANT
EXT ANT RF ATT-26dB
Q501–508 2SA1026 DRIVER
Q509 2SC1633 RIPPLE FILTER
Q804, 805 2SC1633 BUFFER AMP
Q806 2SC1633 SWITCHING
IC806 μPA67C BUFFER AMP
IC805 μPA56C DIGITAL DRIVE
D807 10E-2
D808–813 SLI172-A
D1–5, 17 10E2
D9–16 1S2222
D6–8 1S2222
FILTER BOARD
0.4–0.8MHz
0.8–1.2MHz
1.2–2MHz
2–4MHz
4–8MHz
8–16MHz
16–30MHz
ANTENNA BOARD
D507–513 1S1555
RF BOARD
D111–113 10E2
Q120, 121 2SA1026 AGC
IC101 LA1222 AGC
Q122 2SC1633 AGC
Q107, 108 2SK152 RF AMP
D105, 108 1S2222
D109, 110 1S1555
Q119 2SK42 BUFFER AMP
Q112 2SK152 1st MIX
Q109 2SK152 1st MIX
Q111 2SK43 BUFFER AMP
Q110 2SC9 BUFFER AM
PRE SELECTOR BOARD
S501 PRE SELECTOR OUT IN
D114, 115, 106 1S1555
D501–506 1S2222
D101–103 1S1555
Q103, 104 2SK152 RF AMP 0.4–4MHz
Q105, 106 2SK152 RF AMP 4–30MHz
Q101, 102 2SK43 RF AMP 150–400kHz
VCO BOARD
Q601 2SK152 VCO1 OSC
D601 1T25
D603 1S1555
IC802 μPB552C PRESCALER
D816 VD1221
D817 1S1555
1/2 DIVIDER
1/2 DIVIDER
AC AMP
CMO LEVEL CONVERTER
1/10, 1/11 DIVIDER
Q808 2SA1026
Q807 2SA1 CONTROL
COUNTER BOARD
IC803 CX764 PLL/DIGITAL DISPLAY
Q809 2SC1633 SWITCHING
IC804 μPA57C DIGITAL DRIVE
IC807 IC808 IC809 TC4001 TC4011 TC4030 CONTROL
D803 1S1555
D804 1S1555
Q811 2SA1026 SWITCHING
D802 1S1555
D806 1S1555
D814, 815 1S1555
CONNECTION BOARD


G
H
I
J
K
L
M
N
IC101 LA1222 AGC
Q122 2SC1633 AGC
Q107, 108 2SK152 RF AMP
D105, 108 1S2222
Q112 2SK152 1st MIX
Q109 2SK152 1st MIX
Q111 2SK43 BUFFER AMP
Q110 2SC930D BUFFER AMP
Q119 2SK42 BUFFER AMP
Q113 2SC710 1st AGC
Q116, 117 2SK23 2nd MIX
Q115 2SC930D BUFFER AMP
Q118 2SC930D BUFFER AMP
Q114 2SC710 2nd OSC 56.3MHz
[IF-AF BOARD]
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
Q201 2SC710 AMP
Q202, 203 2SC710
Q204 2SC710 AMP
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
[RF BOARD]
S502 NOISE BLANKER
[VCO BOARD]
Q601 2SK152 VCO1 OSC
D601 1T25
Q602, 603 2SC930D BUFFER AMP
D603 1S1555
D101 – 103 1S1555
Q103, 104 2SK152 RF AMP 0.4 – 4MHz
Q105, 106 2SK152 RF AMP 4 – 30MHz
Q101, 102 2SK43 RF AMP 150 – 400kHz
IC802 μPB552C PRESCALER
D816 VD1221
IC801 TA7060 IF AMP
D817 1S1555
1/2 DIVIDER
CMO LEVEL CONVERTER
1/10, 1/11 DIVIDER
AC AMP
IF AMP
Q808 2SA1026
Q807 2SA1026
CONTROL
D801 1S1555
Q803 2SC930 DRIVER
IC807 IC808 IC809
TC4001 TC4011 TC4030
CONTROL
D803 1S1555
Q811 2SA1026 SWITCHING
D805 1S1555
D804 1S1555
D802 1S1555
D806 1S1555
Q810 2SC1633 SWITCHING
D814, 815 1S1555
S402 SEARCH CHECK ON OFF
S601 PLL LOCK SWITCH UN LOCK LOCK
D407 SLP24B PLL LOCK
[MODE A BOARD]
[SYNTHESIZER BOARD]
IC702 TA7060 IF AMP
IC701 μPC1037 MIXER1
IC704 μPC1037 MIX2
D702 1S1555
Q702 2SC668
Q704 2SC930D BUFFER AMP
Q703 2SC930 OSC 10.240MHz
Q705 2SC930D BUFFER AMP
IC703 μPC1037 MIXER 3
Q701, 707 2SK42 BUFFER
Q708 2SK42 BUFFER
Q706 2SK43 VCO2 OSC
Q712 2SC930D AMP
Q713 2SC930 SWITCHING
Q710 2SC930D SWITCHING
Q709, 711 2SC930D AMP
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
[VFO BOARD]
D604 1S1555
D602 1T25
[IF-AF BOARD]
J204 TIMER
CN201 EXT POWER IN DC-12
[PHOTO DET BOARD]
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
Q406 PS4001 SWITCHING
D409 1S1555
[ANTENNA BOARD]
Q510 2SC1633 RIPPLE FILTER
IC501 VOLTAGE REGULATOR
IC501 μPC78L05 VOLTAGE REGULATOR
DRY BATT (IEC DESIGNATION R20) 8PCS, 12V
ON: WHEN AC ADAPTOR IS INSERTED
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
R902 3.3M (1/2W) (CND ONLY)
CN901 AC INPUT
[POWER BOARD]
AC ADAPTOR
[CONNECTION BOARD]
S403 DIAL LIGHT
PL1 PL2 PL3 PL4
(DIAL)
(METER
BATTERY UM-3×2

AEP, US, E, Canadian MODEL
Serial No.10601 and later

CRF-1 **CRF-1**

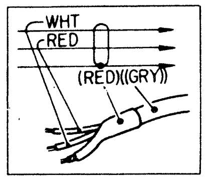
AEP, US, E, Canadian MODEL
Serial No.10601 and later


K
L
M
N
O
P
Q
R
1
2
3
4
5
[IF-AF BOARD]
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
D203 — 208 1S1555
Q219 2SA1026 METER AMP
Q221 2SC1633 MGC CONTROL
Q220 2SA1026 SWITCHING
[VOLUME BOARD]
VR401-1 MGC 20K-A
[MODE B BOARD]
S404 BATT CHECK
ME1(SIGNAL/BATT)
Q218 2SC1633 SWITCHING
Q116, 117 2SK23 2nd MIX
Q115 2SC930D BUFFER AMP
Q118 2SC930D BUFFER AMP
Q114 2SC710 2nd OSC 56.3MHz
CF101
CF102
CF201 WIDE
CF202 NARROW
CF203 SSB·CW
Q201 2SC710 AMP
Q202,203 2SC710 AMP
Q204 2SC710 AMP
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
[RF BOARD]
S502 NOISE BLANKER
[N.B. PRE SELECTOR BOARD]
Q209 2SC710 IF AMP
IC202 µPC1037 SSB DET
Q213 2SC710 USB OSC
Q214 2SC710 LSB OSC
J201 MUTE
J203 EXT SP
OUTPUT
SP
Q210 2SK23 IF AMP
Q212 2SC710 SSB AMP
Q211 2SC710 IF AMP
D209 1S1555 AM DET
[HEAD PHONE BOARD]
J401 HEADPHONES
IC702 TA7060 IF AMP
IC701 µPC1037 MIXER 1
Q705 2SC930D BUFFER AMP
IC703 µPC1037 MIXER 3
Q701,707 2SK42 BUFFER
Q708 2SK42 BUFFER
IC704 µPC1037 MIX 2
D702 1S1555
D701 1T25
IC706 TC5081 PHASE COMPARATOR
PHASE COMPARATOR
Q706 2SK43 VCO2 OSC
Q712 2SC930D AMP
Q713 2SC930D SWITCHING
IC705 MB84013 DIVIDER
Q215,216 2SC1633 AGC
Q217,222 2SC1633 SWITCHING
D210, 212 1S1555
IC203 AF AMP DRIVE POWER AMP
VR401-2 20K-A VOLUME
Q223 2SK23A AGC BUFFER
IC203 µPC1154 POWER AMP
[VOLUME BOARD]
J202 REC OUT
Q710 2SC930D SWITCHING
Q709,711 2SC930D AMP
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
[VFO BOARD]
D604 1S1555
D602 1T25
[IF-AF BOARD]
J204 TIMER
CN201 EXT POWER IN DC-12
S405 POWER
[POWER SWITCH BOARD]
[IF-AF BOARD]
IC204 VOLTAGE REGULATOR
IC204 µPC14305 VOLTAGE REGULATOR
Q407 2SC1173 VOLTAGE REGULATOR
D408 RD9.1E
[CONNECTION BOARD]
S403 DIAL LIGHT
PL1 PL2 PL3 PL4
(DIAL) (METER)
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
CN901 AC INPUT
AC ADAPTOR
[POWER BOARD]
DRY BATT (IEC DESIGNATION R20) 8PCS,12V
ON:WHEN AC ADAPTOR IS INSERTED
[ANTENNA BOARD]
Q510 2SC1633 RIPPLE FILTER
IC501 µPC78L05 VOLTAGE REGULATOR
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
D409 1S1555
BATTERY UM-3×2
[MODE B BOARD]
Q408 2SC1363 LOW-PASS FILTER
Q405 2SC1633 MUTING
Q403, 404 2SC1633 AF AMP
[MODE A BOARD]
Q401 2SC1633 SSB AMP
Q402 2SC1633 HIGH-PASS FILTER
Q409 2SA1026 LOW-PASS FILTER
LOW-PASS FILTER
S401-11, 12 21, 22 31, 32 41, 42 51, 52
D401 — 405 SLP24B
D406 1S1555
[MODE A AND B BOARD]
NARROW
CW
USB
LSB
WIDE

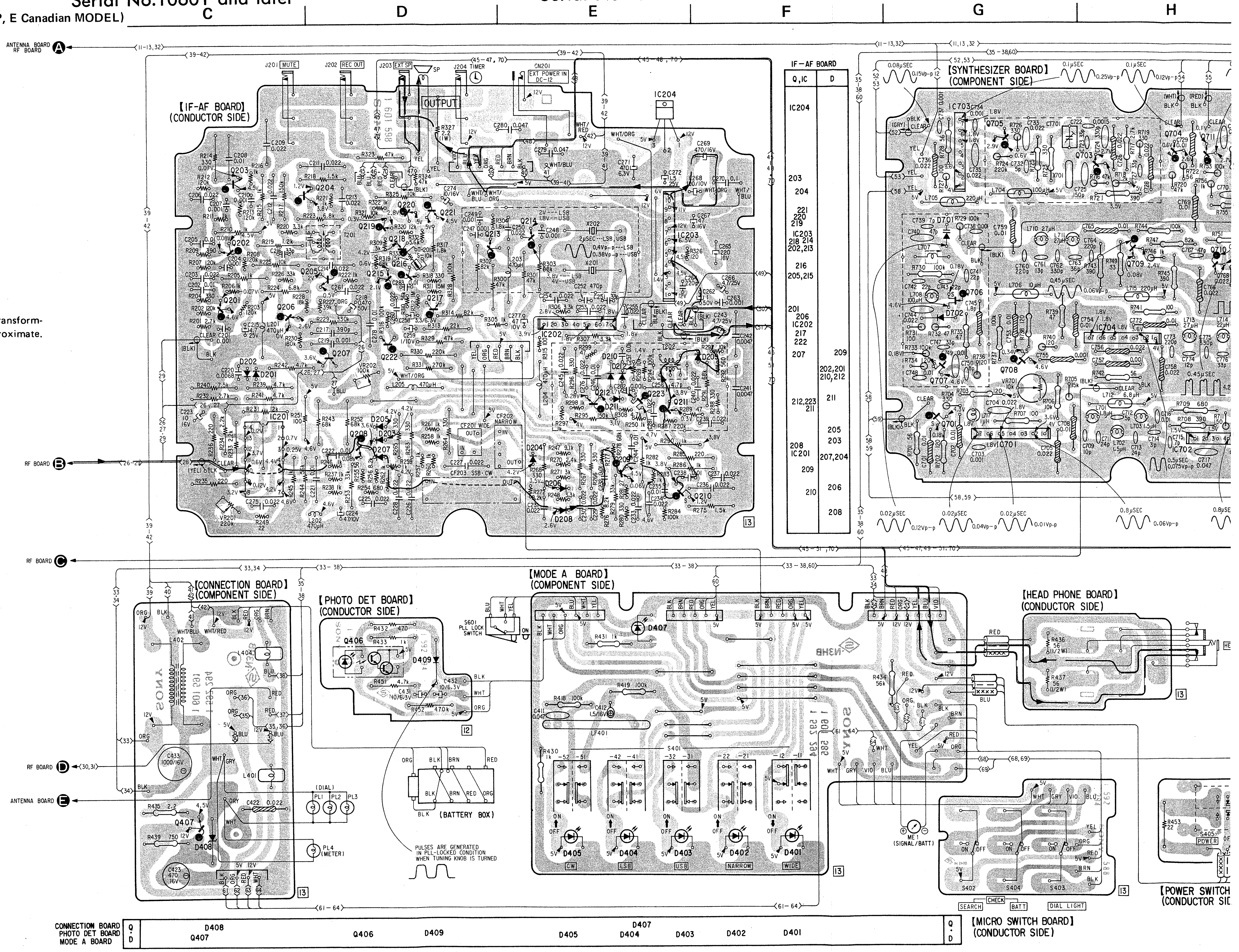
4-5. MOUNTING DIAGRAM (US, AEP, E Canadian MODEL)
Serial No. 10601 and later

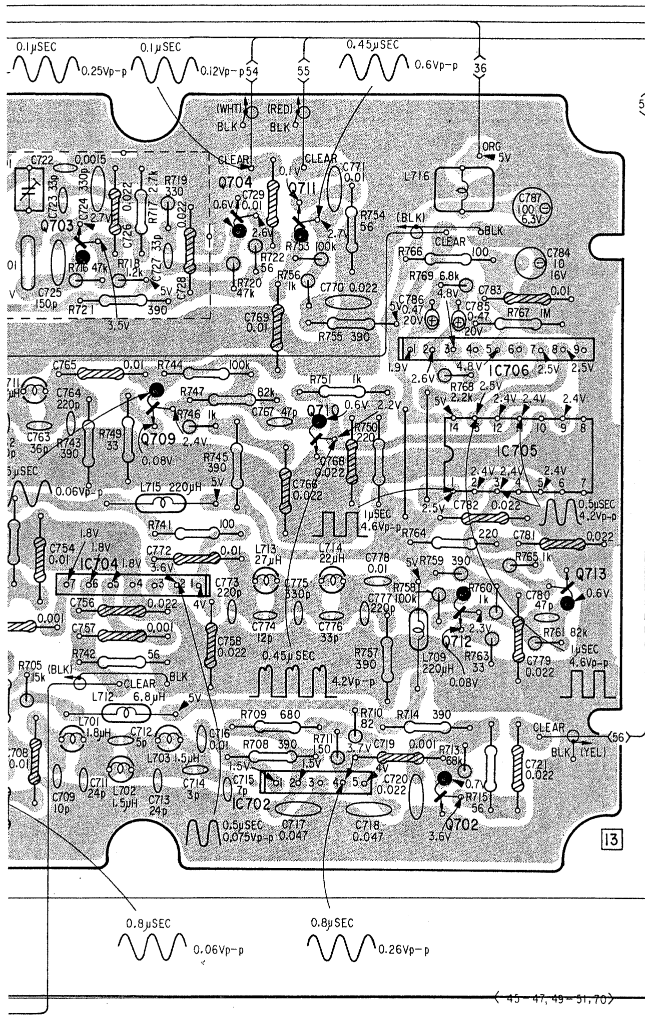
Note:

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

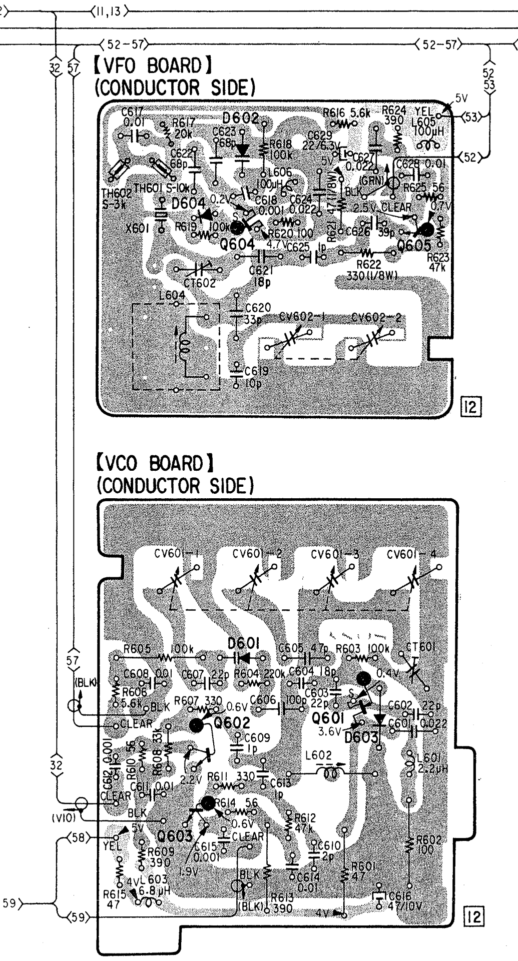
- [ ]← : indicates side identified with part number.
- ⊗ : Through hole.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ░ : B + pattern
- ▬▬▶▬ : signal path
- ⊗—⊗ :component-side pattern.


C
D
E
F
G
H
1
2
3
4
5
ANTENNA BOARD RF BOARD Ⓐ
RF BOARD Ⓑ
RF BOARD Ⓒ
RF BOARD Ⓓ
ANTENNA BOARD Ⓔ
[IF-AF BOARD] (CONDUCTOR SIDE)
J201 MUTE
J202 REC OUT
J203 EXT SP
SP
J204 TIMER
CN201 EXT POWER IN DC-12
OUTPUT
IC204
IC203
IC202
IC201
IF–AF BOARD
Q,IC
D
[SYNTHESIZER BOARD] (COMPONENT SIDE)
IC703
IC704
IC702
IC701
[CONNECTION BOARD] (COMPONENT SIDE)
[PHOTO DET BOARD] (CONDUCTOR SIDE)
S601 PLL LOCK SWITCH
(BATTERY BOX)
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED
(DIAL) PL1 PL2 PL3
PL4 (METER)
[MODE A BOARD] (COMPONENT SIDE)
S401
D405 CW
D404 LSB
D403 USB
D402 NARROW
D401 WIDE
ME1 (SIGNAL/BATT)
[HEAD PHONE BOARD] (CONDUCTOR SIDE)
[MICRO SWITCH BOARD] (CONDUCTOR SIDE)
S402 SEARCH
S404 CHECK BATT
S403 DIAL LIGHT
S405 POWER
[POWER SWITCH (CONDUCTOR SIDE)
CONNECTION BOARD PHOTO DET BOARD MODE A BOARD
Q
D
D408
Q407
Q406
D409
D405
D407
D404
D403
D402
D401


0.1μSEC 0.25Vp-p
0.1μSEC 0.12Vp-p
0.45μSEC 0.6Vp-p
0.8μSEC 0.06Vp-p
0.8μSEC 0.26Vp-p
IC703
IC704
IC705
IC706
IC702
13

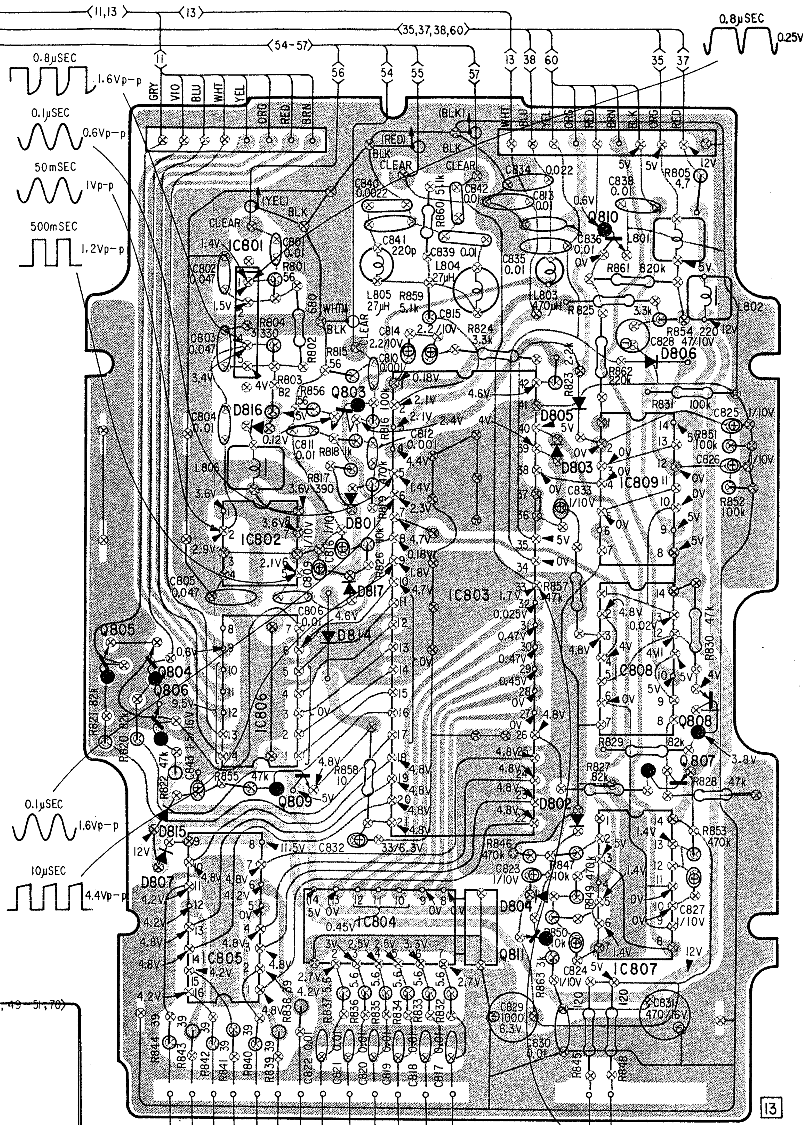
SYNTHESIZER BOARD

Q,IC	D
705	
IC703	
704,711	
703	
IC706	
	701
709	
710	
IC705	
706	
	702
IC704	
713	
712	
708	
707	
701	
IC701	
IC702	
702	


【VFO BOARD】
(CONDUCTOR SIDE)
【VCO BOARD】
(CONDUCTOR SIDE)
12

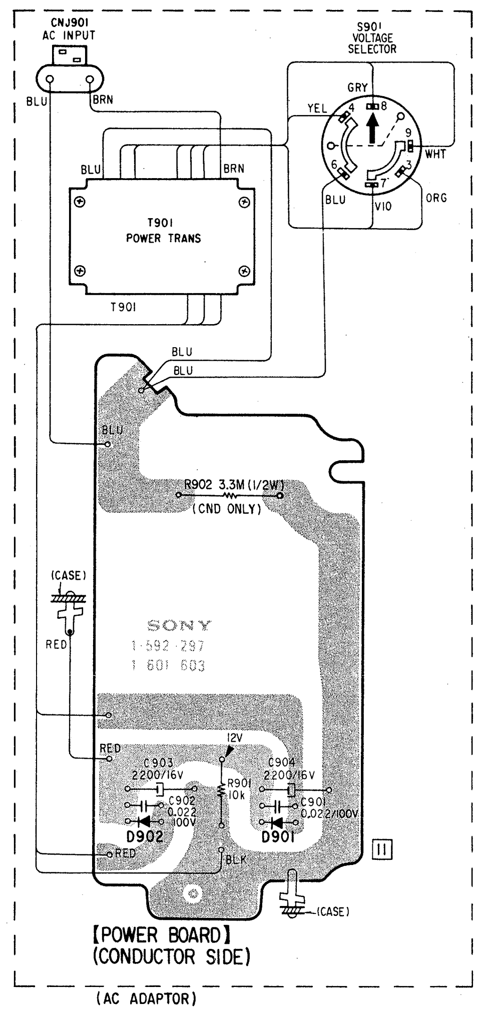
VFO, VCO BOARD

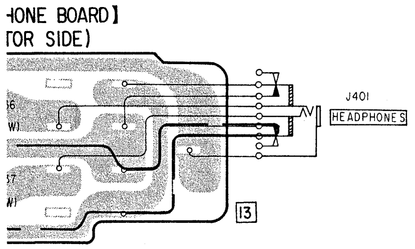
Q	D
	602
604	604
605	
	601
601	
	603
602	
603	

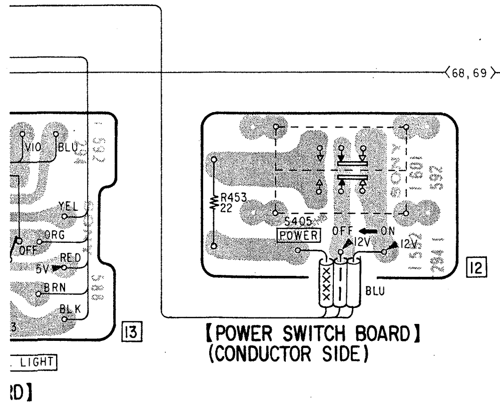

0.8μSEC 1.6Vp-p
0.1μSEC 0.6Vp-p
50mSEC 1Vp-p
500mSEC 1.2Vp-p
0.1μSEC 1.6Vp-p
10μSEC 4.4Vp-p
0.8μSEC 0.25Vp-p
IC801
IC802
IC803
IC804
IC805
IC806
IC807
IC808
IC809
13

COUNTER BOARD

Q,IC	D
810	
IC801	
	806
	805
803	816
	803
IC809	
	801
IC802	
	817
IC803	
	814
IC808	
805 804	
IC806 808	
806	
807	
809	
	815 802
	807
IC807	
IC805	804
IC804 811	

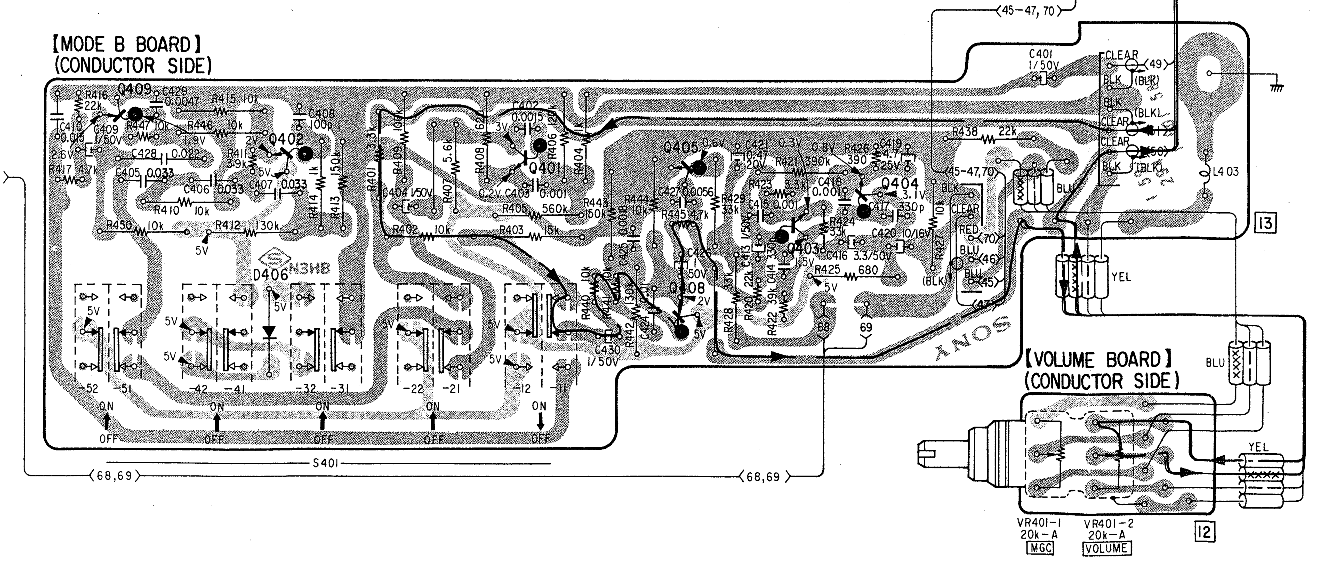

CNJ901
AC INPUT
S901
VOLTAGE
SELECTOR
T901
POWER TRANS
R902 3.3M (1/2W)
(CND ONLY)
SONY
1-592-297
1-601-603
C903 2200/16V
C904 2200/16V
D902
D901
11
【POWER BOARD】
(CONDUCTOR SIDE)
(AC ADAPTOR)

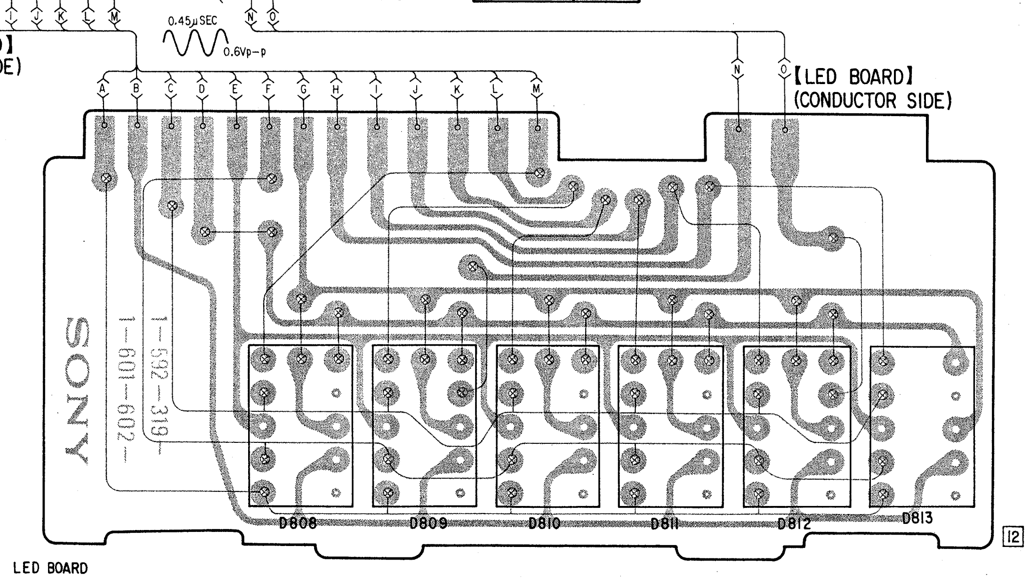

HONE BOARD】
TOR SIDE)
J401
HEADPHONES
13


S405
POWER
13
12
【POWER SWITCH BOARD】
(CONDUCTOR SIDE)
LIGHT
RD】

MODE B BOARD

Q·D	Q409	Q402	Q401	Q405	Q403	Q404
		D406		Q408		

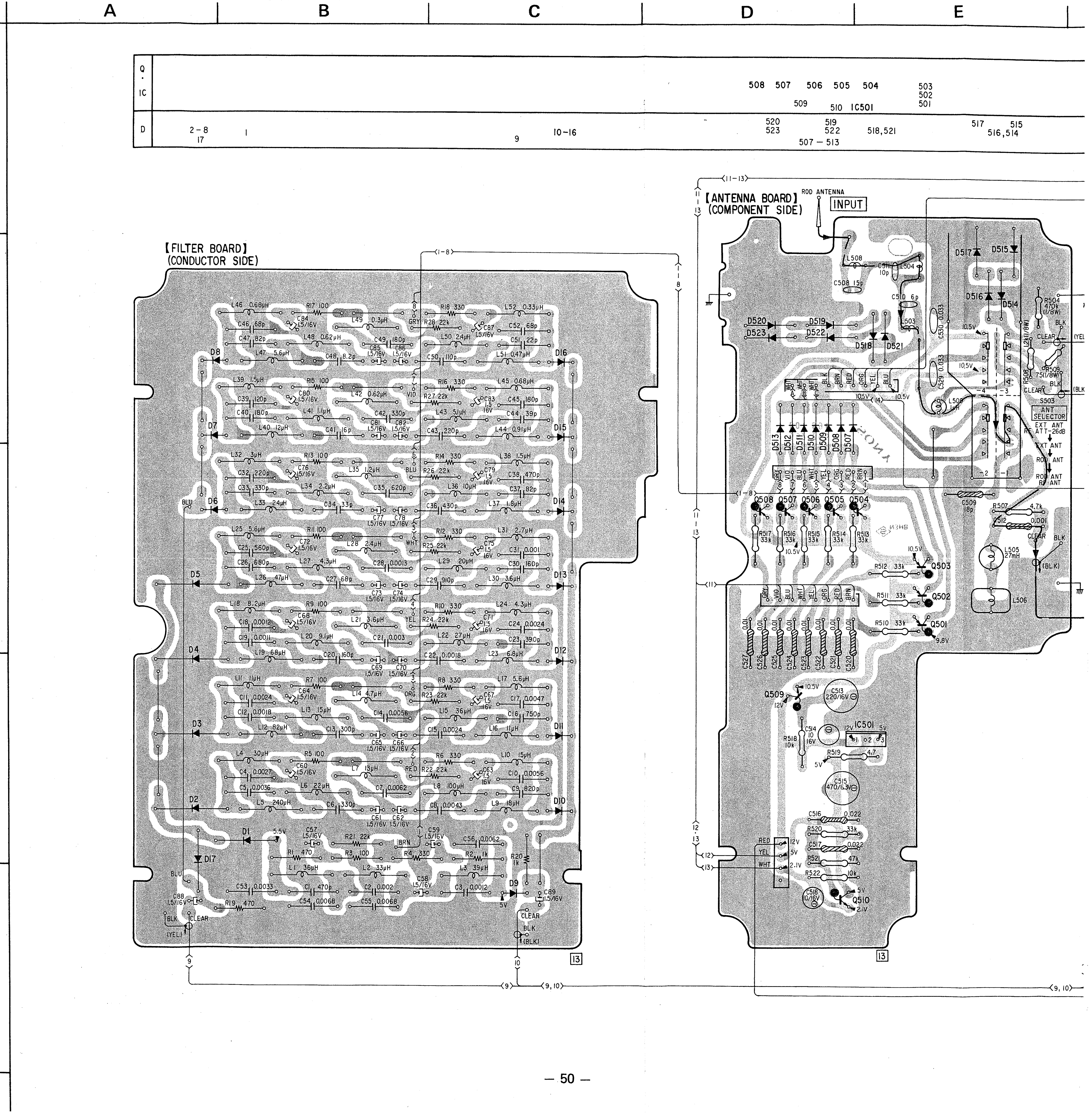

【MODE B BOARD】
(CONDUCTOR SIDE)
S401
SONY
13
【VOLUME BOARD】
(CONDUCTOR SIDE)
VR401-1 20k-A MGC
VR401-2 20k-A VOLUME
12


0.45μSEC 0.6Vp-p
【COUNTER BOARD】
(COMPONENT SIDE)
【LED BOARD】
(CONDUCTOR SIDE)
SONY
1-592-319
1-601-602
D808
D809
D810
D811
D812
D813
12

LED BOARD

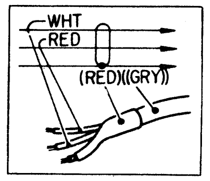
D	808	809	810	811	812	813

4-6. MOUNTING DIAGRAM (US, AEP, E Canadian MODEL) Serial No. 10601 and later

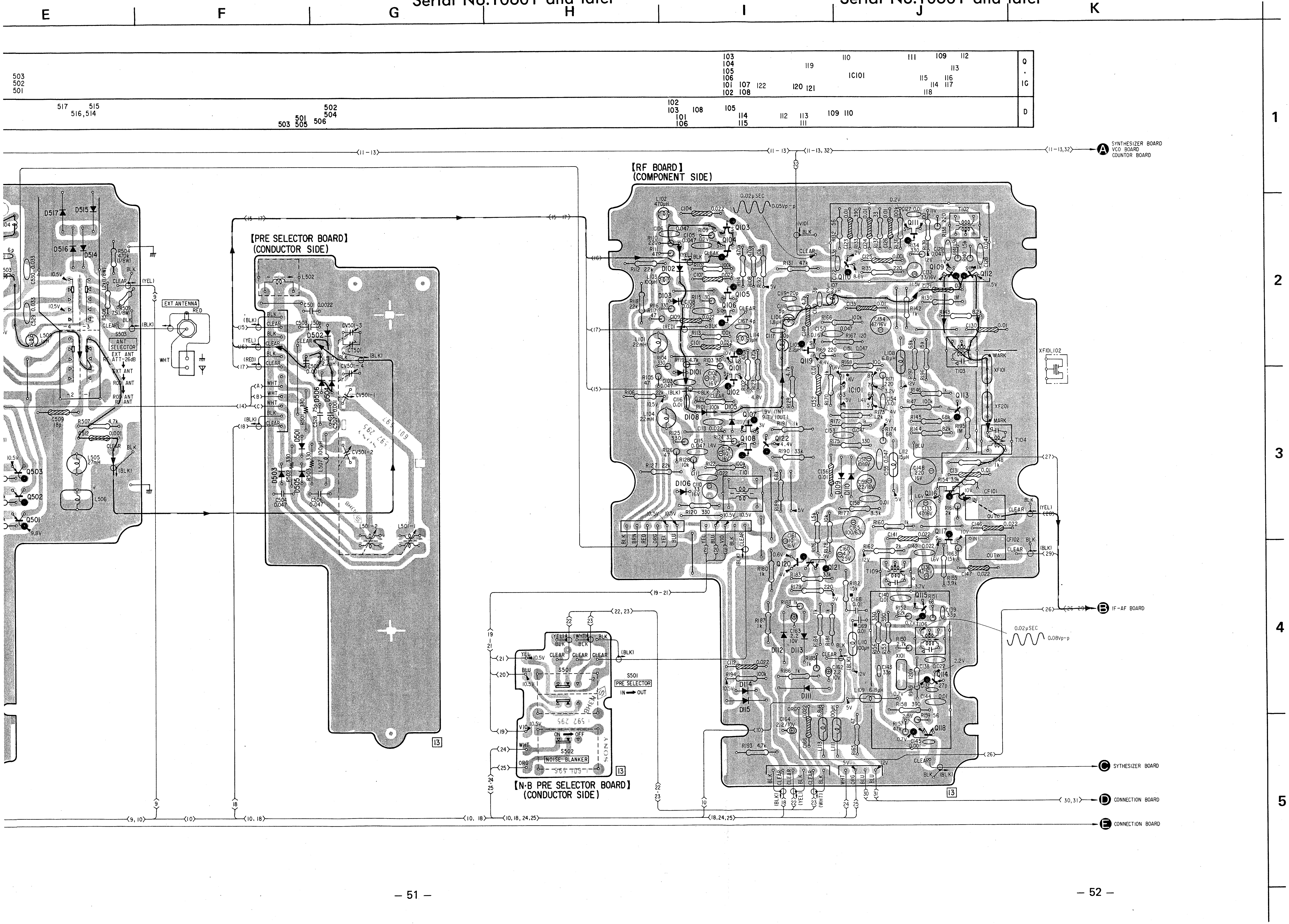

A
B
C
D
E
1
2
3
4
5
Q·IC
D
508 507 506 505 504
509 510 IC501
503 502 501
2-8 17
1
9
10-16
520 523
519 522
507-513
518,521
517 515 516,514
[FILTER BOARD] (CONDUCTOR SIDE)
[ANTENNA BOARD] (COMPONENT SIDE)
ROD ANTENNA
INPUT
S503 ANT SELECTOR
EXT ANT
RF ATT-26dB
EXT ANT
ROD ANT
ROD ANT
R/ ANT
Q501
Q502
Q503
Q504
Q505
Q506
Q507
Q508
Q509
Q510
IC501
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
(1-8)
(11-13)
(11)
(12)
(13)
(9)
(9,10)
BLU
BLK
YEL
CLEAR
RED
WHT
(BLK)
13

Note:

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)(GRY)

- [ ]- : indicates side identified with part number.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ░ : B + pattern
- ▬▶▬ : signal path


E
F
G
H
I
J
K
1
2
3
4
5
Q
IC
D
【RF BOARD】
(COMPONENT SIDE)
【PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
【N·B PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
EXT ANTENNA
RED
WHT
S503
ANT SELECTOR
EXT ANT
ATT -26dB
ROD ANT
S501
PRE SELECTOR
IN ➡ OUT
S502
NOISE BLANKER
ON ➡ OFF
0.02μSEC
0.05Vp-p
0.08Vp-p
XF101,102
A SYNTHESIZER BOARD VCO BOARD COUNTOR BOARD
B IF-AF BOARD
C SYTHESIZER BOARD
D CONNECTION BOARD
E CONNECTION BOARD
13

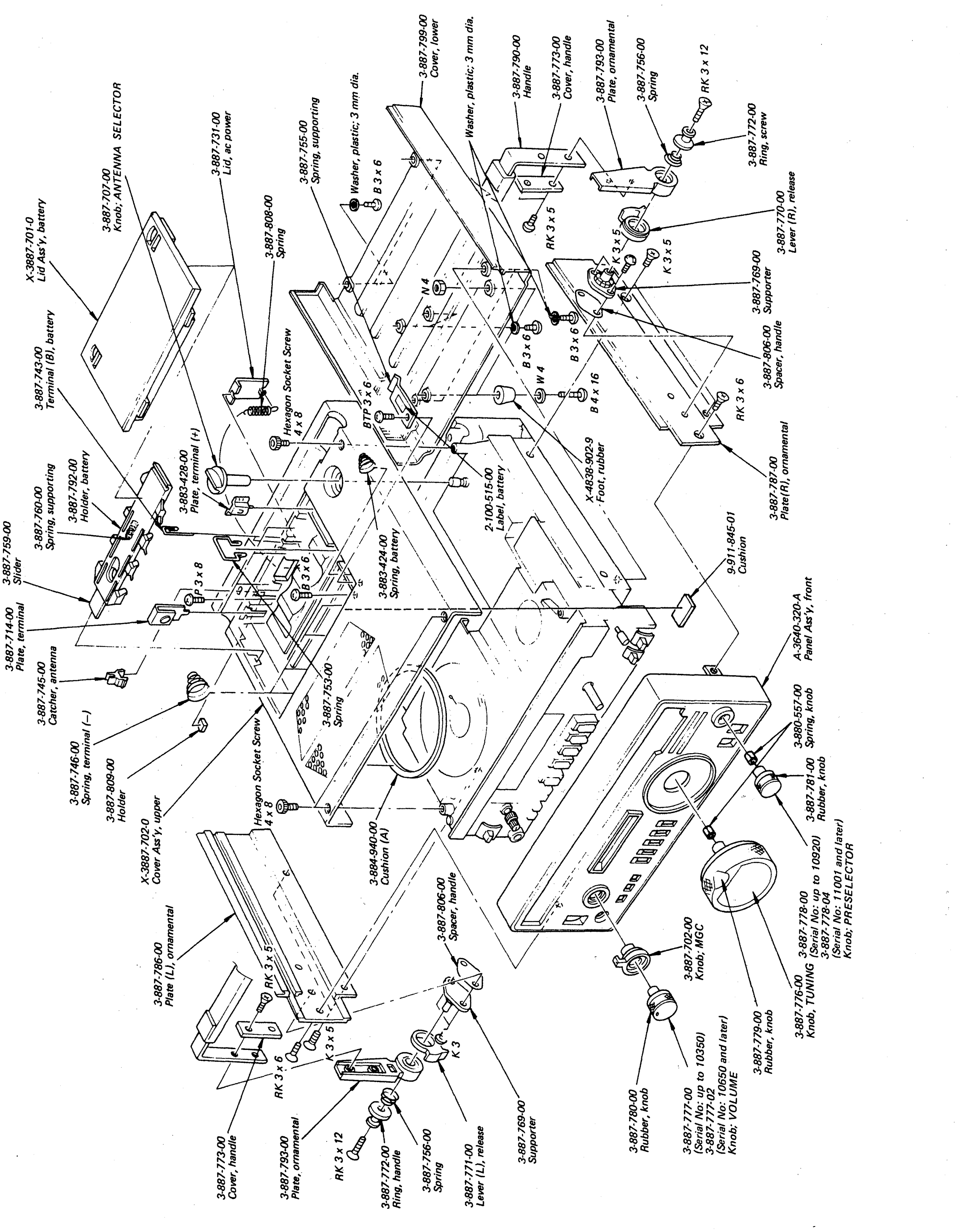
SECTION 5
EXPLODED VIEWS

Note:
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- (□□T) shows the number of coils in spring.

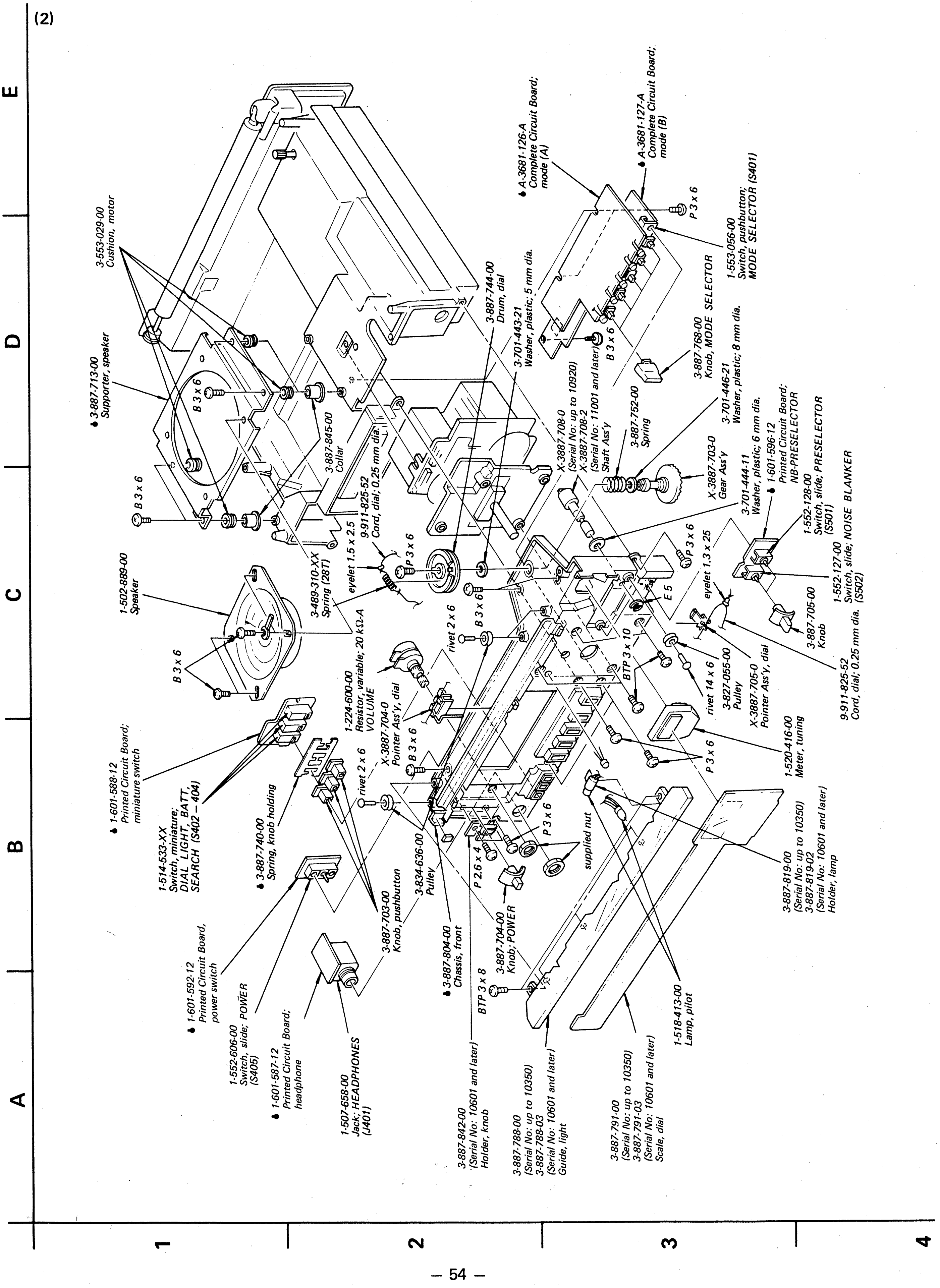
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

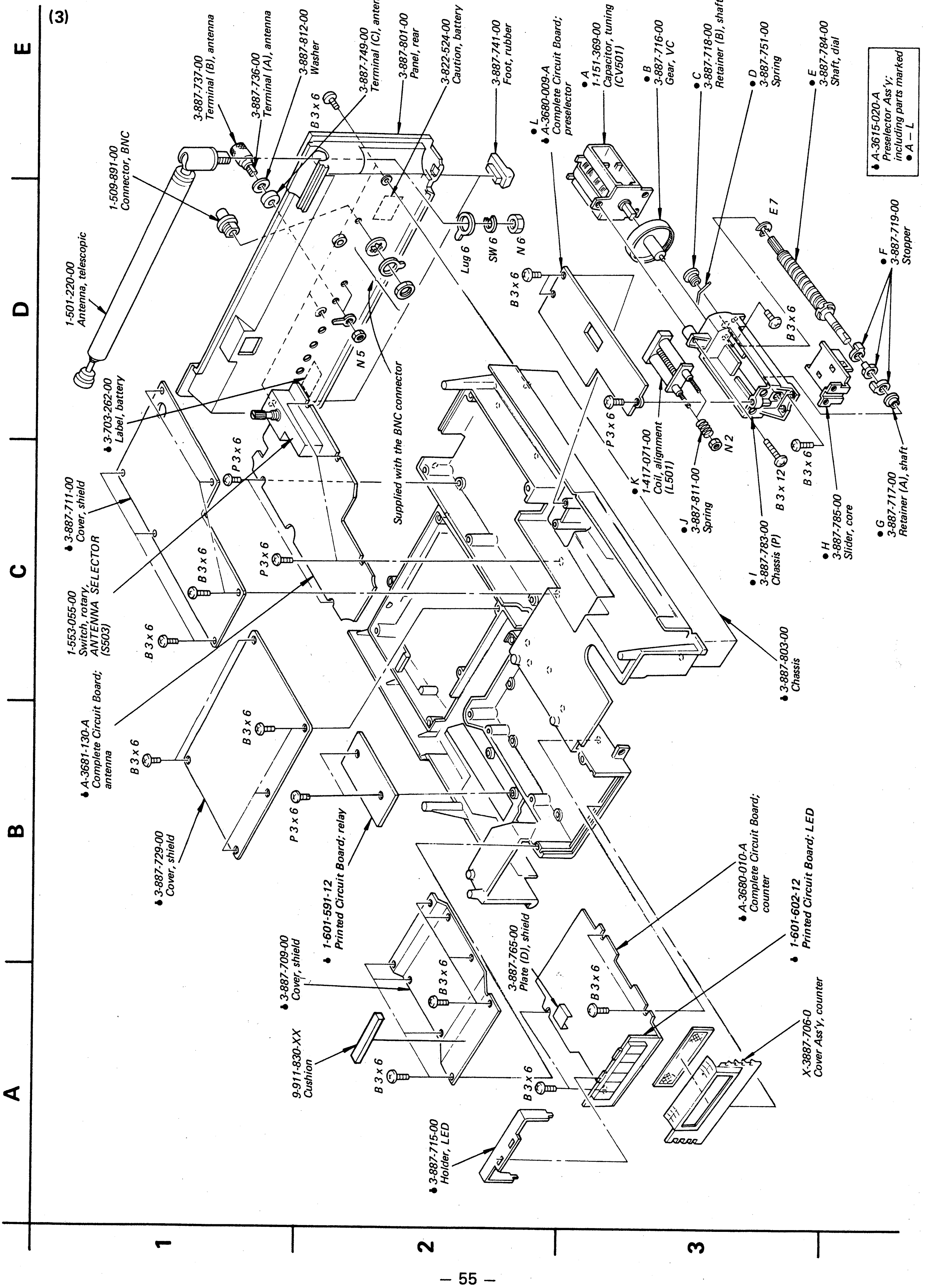
Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

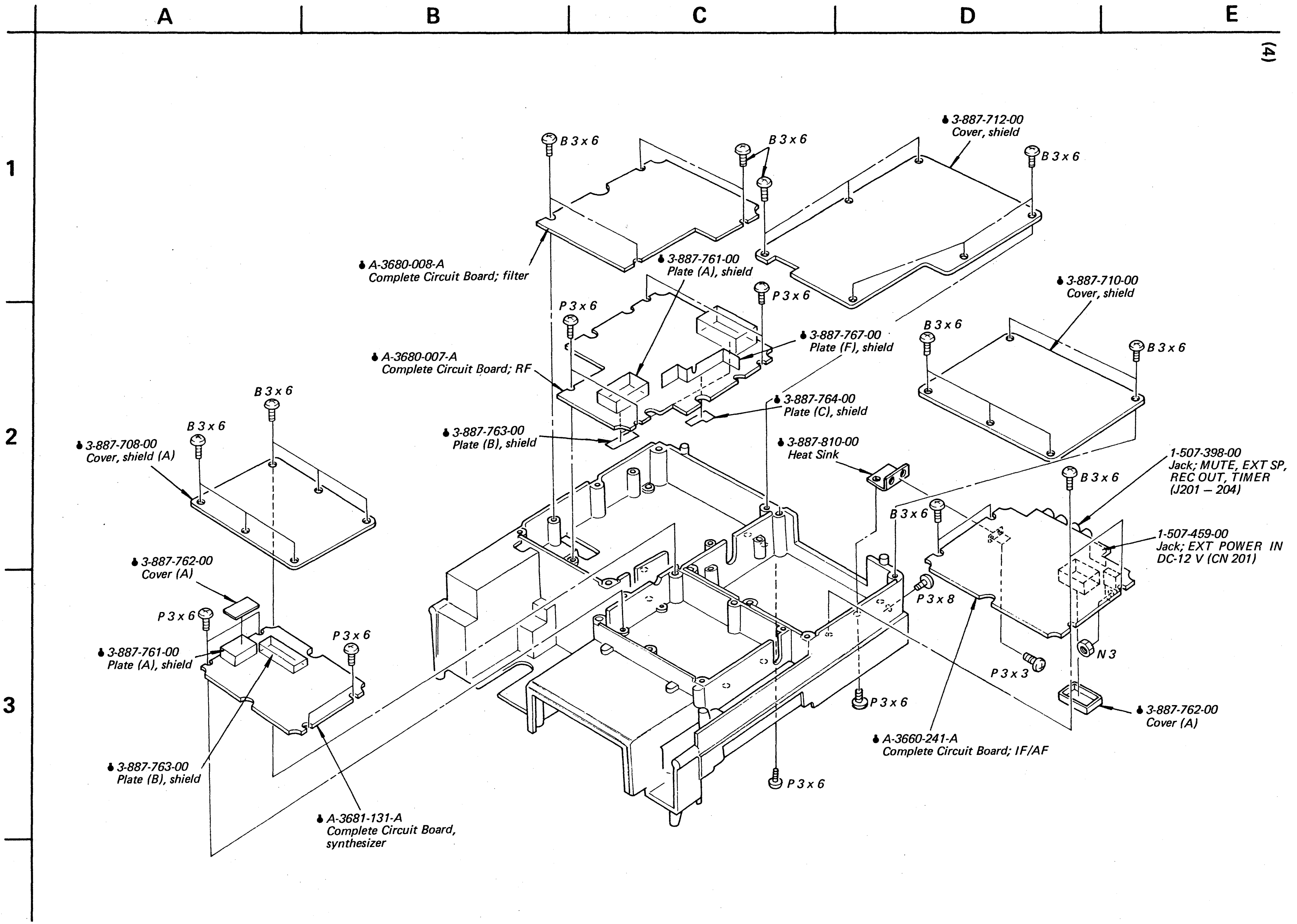
(1)

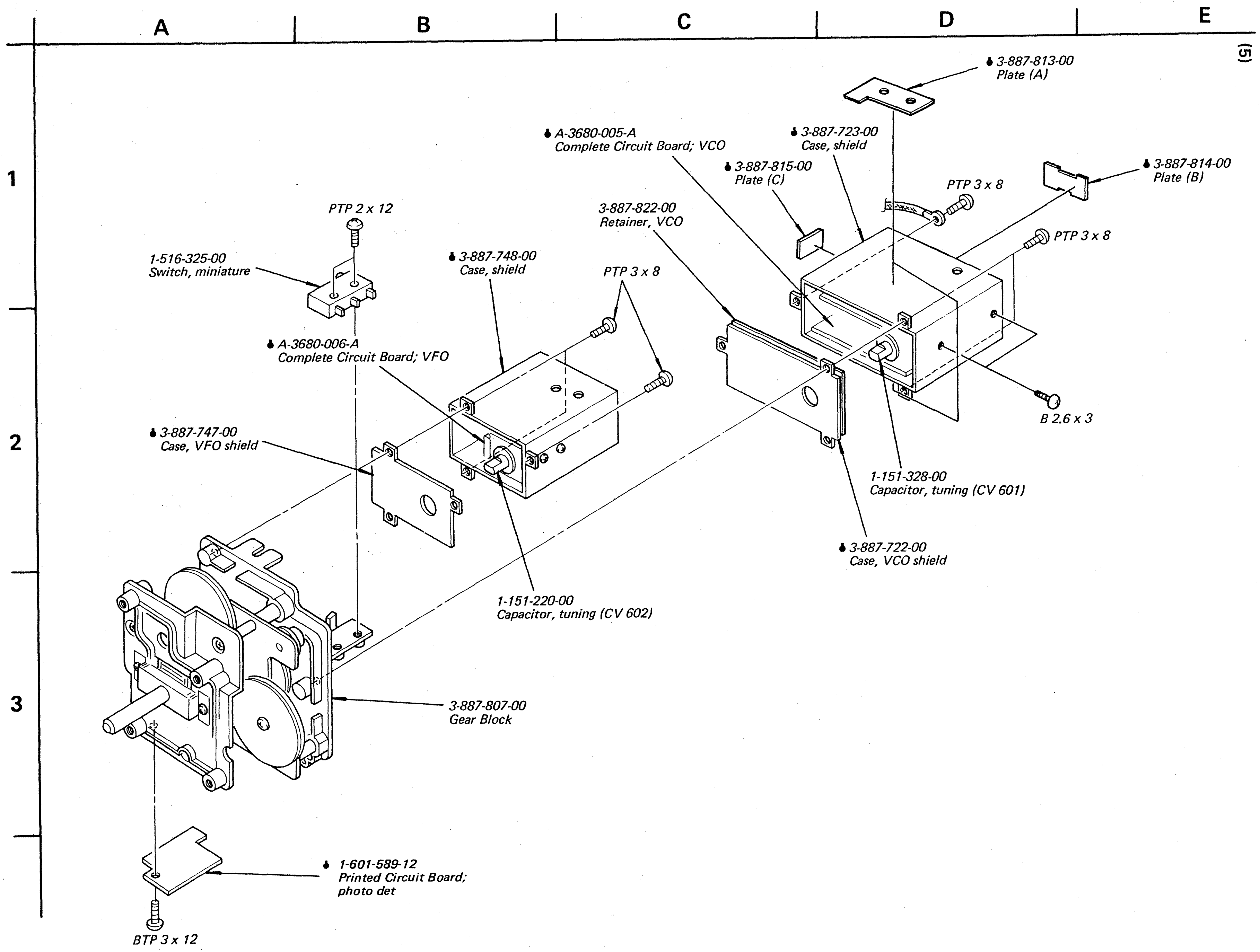

X-3887-701-0 Lid Ass'y, battery
3-887-707-00 Knob; ANTENNA SELECTOR
3-887-731-00 Lid, ac power
3-887-808-00 Spring
3-887-755-00 Spring, supporting
Washer, plastic; 3 mm dia.
B 3 x 6
3-887-799-00 Cover, lower
Washer, plastic; 3 mm dia.
3-887-790-00 Handle
3-887-773-00 Cover, handle
3-887-793-00 Plate, ornamental
3-887-756-00 Spring
RK 3 x 12
3-887-772-00 Ring, screw
3-887-770-00 Lever (R), release
K 3 x 5
K 3 x 5
RK 3 x 5
3-887-769-00 Supporter
3-887-806-00 Spacer, handle
N 4
B 3 x 6
B 3 x 6
W 4
B 4 x 16
RK 3 x 6
3-887-787-00 Plate (R), ornamental
3-887-743-00 Terminal (B), battery
Hexagon Socket Screw 4 x 8
BTP 3 x 6
X-4838-902-9 Foot, rubber
3-887-792-00 Holder, battery
3-887-760-00 Spring, supporting
3-887-759-00 Slider
3-883-428-00 Plate, terminal (+)
2-100-515-00 Label, battery
9-911-845-01 Cushion
P 3 x 8
B 3 x 6
3-883-424-00 Spring, battery
3-887-714-00 Plate, terminal
3-887-745-00 Catcher, antenna
3-887-753-00 Spring
A-3640-320-A Panel Ass'y, front
3-887-746-00 Spring, terminal (-)
3-887-809-00 Holder
Hexagon Socket Screw 4 x 8
3-880-557-00 Spring, knob
3-887-781-00 Rubber, knob
X-3887-702-0 Cover Ass'y, upper
3-884-940-00 Cushion (A)
3-887-778-00 (Serial No: up to 10920)
3-887-778-04 (Serial No: 11001 and later)
Knob; PRESELECTOR
3-887-786-00 Plate (L), ornamental
3-887-806-00 Spacer, handle
RK 3 x 5
3-887-702-00 Knob; MGC
K 3 x 5
K 3
RK 3 x 6
3-887-776-00 Knob, TUNING
3-887-779-00 Rubber, knob
3-887-777-00 (Serial No: up to 10350)
3-887-777-02 (Serial No: 10650 and later)
Knob; VOLUME
3-887-780-00 Rubber, knob
3-887-769-00 Supporter
3-887-773-00 Cover, handle
3-887-793-00 Plate, ornamental
RK 3 x 12
3-887-772-00 Ring, handle
3-887-756-00 Spring
3-887-771-00 Lever (L), release

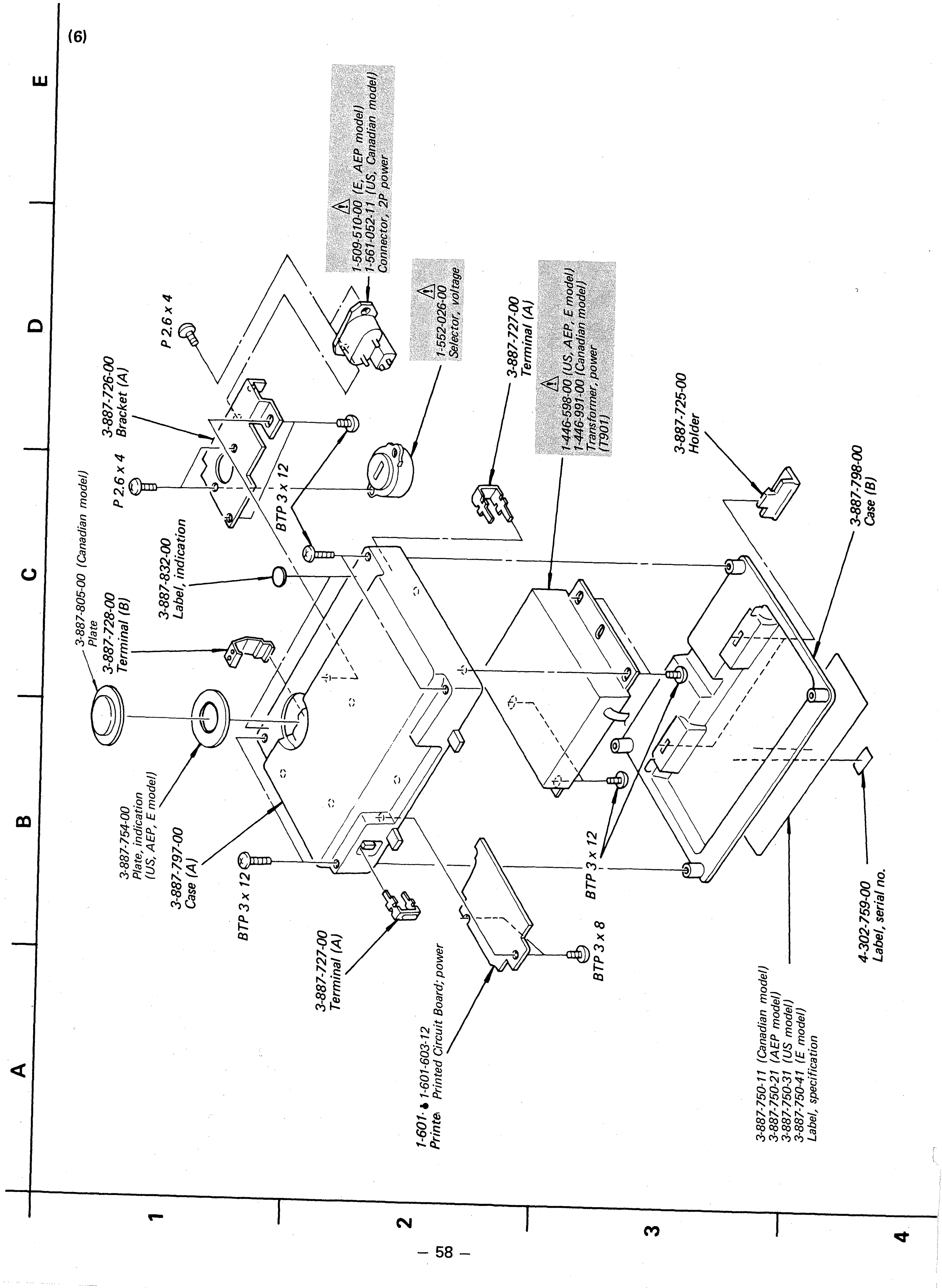
(2)


A
B
C
D
E
1
2
3
4
3-553-029-00
Cushion, motor
♦ 3-887-713-00
Supporter, speaker
B 3 x 6
B 3 x 6
3-887-845-00
Collar
1-502-889-00
Speaker
B 3 x 6
3-489-310-XX
Spring (28T)
eyelet 1.5 x 2.5
9-911-825-52
Cord, dial; 0.25 mm dia.
P 3 x 6
3-887-744-00
Drum, dial
3-701-443-21
Washer, plastic; 5 mm dia.
♦ A-3681-126-A
Complete Circuit Board;
mode (A)
♦ A-3681-127-A
Complete Circuit Board;
mode (B)
P 3 x 6
1-553-056-00
Switch, pushbutton;
MODE SELECTOR (S401)
B 3 x 6
3-887-768-00
Knob, MODE SELECTOR
3-701-446-21
Washer, plastic; 8 mm dia.
X-3887-708-0
(Serial No: up to 10920)
X-3887-708-2
(Serial No: 11001 and later)
Shaft Ass'y
3-887-752-00
Spring
X-3887-703-0
Gear Ass'y
3-701-444-11
Washer, plastic; 6 mm dia.
♦ 1-601-596-12
Printed Circuit Board;
NB-PRESELECTOR
1-552-128-00
Switch, slide; PRESELECTOR
(S501)
1-552-127-00
Switch, slide; NOISE BLANKER
(S502)
3-887-705-00
Knob
P 3 x 6
eyelet 1.3 x 25
E 5
BTP 3 x 10
rivet 14 x 6
3-827-055-00
Pulley
X-3887-705-0
Pointer Ass'y, dial
9-911-825-52
Cord, dial; 0.25 mm dia.
1-520-416-00
Meter, tuning
P 3 x 6
B 3 x 6
rivet 2 x 6
1-224-600-00
Resistor, variable; 20 kΩ-A
VOLUME
X-3887-704-0
Pointer Ass'y, dial
B 3 x 6
rivet 2 x 6
B 3 x 6
♦ 1-601-588-12
Printed Circuit Board;
miniature switch
1-514-533-XX
Switch, miniature;
DIAL LIGHT, BATT,
SEARCH (S402 – 404)
♦ 3-887-740-00
Spring, knob holding
3-834-636-00
Pulley
3-887-703-00
Knob, pushbutton
P 3 x 6
supplied nut
P 2.6 x 4
3-887-704-00
Knob; POWER
♦ 3-887-804-00
Chassis, front
BTP 3 x 8
3-887-819-00
(Serial No: up to 10350)
3-887-819-02
(Serial No: 10601 and later)
Holder, lamp
1-518-413-00
Lamp, pilot
♦ 1-601-592-12
Printed Circuit Board,
power switch
1-552-606-00
Switch, slide; POWER
(S405)
♦ 1-601-587-12
Printed Circuit Board;
headphone
1-507-658-00
Jack; HEADPHONES
(J401)
3-887-842-00
(Serial No: 10601 and later)
Holder, knob
3-887-788-00
(Serial No: up to 10350)
3-887-788-03
(Serial No: 10601 and later)
Guide, light
3-887-791-00
(Serial No: up to 10350)
3-887-791-03
(Serial No: 10601 and later)
Scale, dial


(3)
E
D
C
B
A
1
2
3
1-501-220-00
Antenna, telescopic
1-509-891-00
Connector, BNC
3-887-737-00
Terminal (B), antenna
3-887-736-00
Terminal (A), antenna
3-887-812-00
Washer
3-887-749-00
Terminal (C), antenna
3-887-801-00
Panel, rear
3-822-524-00
Caution, battery
3-887-741-00
Foot, rubber
● L
● A-3680-009-A
Complete Circuit Board; preselector
● A
1-151-369-00
Capacitor, tuning (CV501)
● B
3-887-716-00
Gear, VC
● C
3-887-718-00
Retainer (B), shaft
● D
3-887-751-00
Spring
● E
3-887-784-00
Shaft, dial
● A-3615-020-A
Preselector Ass'y; including parts marked
● A – L
E 7
● F
3-887-719-00
Stopper
● G
3-887-717-00
Retainer (A), shaft
● H
3-887-785-00
Slider, core
● I
3-887-783-00
Chassis (P)
● J
3-887-811-00
Spring
● K
1-417-071-00
Coil, alignment (L501)
N 2
B 3 x 12
B 3 x 6
P 3 x 6
Lug 6
SW 6
N 6
N 5
Supplied with the BNC connector
● 3-703-262-00
Label, battery
● 3-887-711-00
Cover, shield
1-553-055-00
Switch, rotary, ANTENNA SELECTOR (S503)
● A-3681-130-A
Complete Circuit Board; antenna
● 3-887-803-00
Chassis
● 3-887-729-00
Cover, shield
● 1-601-591-12
Printed Circuit Board; relay
● A-3680-010-A
Complete Circuit Board; counter
● 1-601-602-12
Printed Circuit Board; LED
3-887-765-00
Plate (D), shield
● 3-887-709-00
Cover, shield
9-911-830-XX
Cushion
● 3-887-715-00
Holder, LED
X-3887-706-0
Cover Ass'y, counter


A
B
C
D
E
1
2
3
(4)
B 3 x 6
B 3 x 6
♦ 3-887-712-00
Cover, shield
B 3 x 6
♦ A-3680-008-A
Complete Circuit Board; filter
♦ 3-887-761-00
Plate (A), shield
P 3 x 6
P 3 x 6
♦ 3-887-710-00
Cover, shield
B 3 x 6
B 3 x 6
♦ 3-887-767-00
Plate (F), shield
♦ A-3680-007-A
Complete Circuit Board; RF
B 3 x 6
♦ 3-887-764-00
Plate (C), shield
B 3 x 6
♦ 3-887-763-00
Plate (B), shield
♦ 3-887-810-00
Heat Sink
♦ 3-887-708-00
Cover, shield (A)
1-507-398-00
Jack; MUTE, EXT SP,
REC OUT, TIMER
(J201 – 204)
B 3 x 6
B 3 x 6
1-507-459-00
Jack; EXT POWER IN
DC-12 V (CN 201)
♦ 3-887-762-00
Cover (A)
P 3 x 8
P 3 x 6
♦ 3-887-761-00
Plate (A), shield
P 3 x 6
N 3
P 3 x 3
P 3 x 6
♦ 3-887-762-00
Cover (A)
♦ 3-887-763-00
Plate (B), shield
♦ A-3660-241-A
Complete Circuit Board; IF/AF
P 3 x 6
♦ A-3681-131-A
Complete Circuit Board,
synthesizer


A
B
C
D
E
1
2
3
(5)
3-887-813-00
Plate (A)
A-3680-005-A
Complete Circuit Board; VCO
3-887-723-00
Case, shield
3-887-815-00
Plate (C)
3-887-814-00
Plate (B)
PTP 3 x 8
PTP 3 x 8
PTP 2 x 12
3-887-822-00
Retainer, VCO
1-516-325-00
Switch, miniature
3-887-748-00
Case, shield
PTP 3 x 8
A-3680-006-A
Complete Circuit Board; VFO
B 2.6 x 3
3-887-747-00
Case, VFO shield
1-151-328-00
Capacitor, tuning (CV 601)
3-887-722-00
Case, VCO shield
1-151-220-00
Capacitor, tuning (CV 602)
3-887-807-00
Gear Block
1-601-589-12
Printed Circuit Board;
photo det
BTP 3 x 12


(6)
E
D
C
B
A
1
2
3
4
⚠ 1-509-510-00 (E, AEP model)
1-561-052-11 (US, Canadian model)
Connector, 2P power
⚠ 1-552-026-00
Selector, voltage
P 2.6 x 4
3-887-726-00
Bracket (A)
3-887-727-00
Terminal (A)
⚠ 1-446-598-00 (US, AEP, E model)
1-446-991-00 (Canadian model)
Transformer, power
(T901)
3-887-725-00
Holder
3-887-798-00
Case (B)
P 2.6 x 4
BTP 3 x 12
3-887-832-00
Label, indication
3-887-805-00 (Canadian model)
Plate
3-887-728-00
Terminal (B)
3-887-754-00
Plate, indication
(US, AEP, E model)
3-887-797-00
Case (A)
BTP 3 x 12
BTP 3 x 12
BTP 3 x 8
3-887-727-00
Terminal (A)
1-601· ● 1-601-603-12
Printe Printed Circuit Board; power
4-302-759-00
Label, serial no.
3-887-750-11 (Canadian model)
3-887-750-21 (AEP model)
3-887-750-31 (US model)
3-887-750-41 (E model)
Label, specification

SECTION 6
ELECTRICAL PARTS LIST

- Items marked "♠" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SEMICONDUCTORS

Transistors

Ref. No.	*Part No.*	*Description*
Q101, 102	8-723-304-00	2SK43-4
Q103–109	8-765-422-00	2SK152-2
Q110	8-729-803-04	2SC930
Q111	8-723-304-00	2SK43-4
Q112	8-765-422-00	2SK152-2
Q113	8-729-671-12	2SC710-12
Q114	8-729-671-13	2SC710-13
Q115	8-729-803-04	2SC930
Q116, 117	8-722-384-01	2SK23A-840 (BLU)
Q118	8-729-803-04	2SC930
Q119	8-727-313-00	2SK42-3
Q120, 121	8-729-612-77	2SA1027R
Q122	8-729-663-47	2SC1364
Q201–204	8-729-671-13	2SC710-13
Q205	8-729-663-47	2SC1364
Q206	8-729-612-77	2SA1027R
Q207	8-729-663-47	2SC1364
Q208, 209	8-729-671-13	2SC710-13
Q210	8-722-384-01	2SK23A-840 (BLU)
Q211–214	8-729-671-13	2SC710-13
Q215–217	8-729-663-47	2SC1364
Q219, 220	8-729-612-77	2SA1027R
Q221	8-729-663-47	2SC1364
Q401–405	8-729-663-47	2SC1364
Q406	8-719-140-01	PS4001
Q407	8-729-217-33	2SC1173
Q408	8-729-663-47	2SC1364
Q409 Q501–508	8-729-612-77	2SA1027R
Q509, 510	8-729-663-47	2SC1364
Q601	8-765-422-00	2SK152-2
Q602, 603	8-729-803-04	2SC930
Q604	8-723-304-00	2SK43-4
Q605	8-729-803-04	2SC930
Q701	8-727-313-00	2SK42-3
Q702	8-729-806-84	2SC668
Q703–705	8-729-803-04	2SC930
Q706	8-723-304-00	2SK43-4
Q707, 708	8-727-313-00	2SK42-3
Q709–713	8-729-803-04	2SC930
Q801	8-729-803-04	2SC930 (Serial No: up to 10600)
Q802	8-729-364-12	2SC641K (Serial No: up to 10600)
Q803	8-729-803-04	2SC930
Q804–806	8-729-663-47	2SC1364
Q807, 808	8-729-612-77	2SA1027R
Q809, 810	8-729-663-47	2SC1364
Q811	8-729-612-77	2SA1027R

ICs

Ref. No.	*Part No.*	*Description*
IC101	8-759-812-22	LA1222
IC201	8-759-271-58	TA7158P
IC202	8-759-110-37	μPC1037H
IC203	8-759-111-54	μPC1154H
IC204	8-759-143-05	μPC14305H
IC501	8-759-108-05	μPC78L05A
IC701	8-759-110-37	μPC1037H
IC702	8-759-270-60	TA7060P
IC703, 704	8-759-110-37	μPC1037H
IC705	8-759-984-13	MB84013M
IC706	8-759-250-81	TC5081P
IC801	8-759-270-60	TA7060P
IC802	8-759-900-90	SN74LS90N (Serial No: up to 10600)
IC802	8-759-155-21	μPB552C (Serial No: 10601 and later)
IC803	8-759-107-64	CX-764
IC804	8-759-100-57	μPA57C
IC805	8-759-100-56	μPA56C
IC806	8-759-100-67	μPA67C
IC807	8-759-240-01	TC4001BP
IC808	8-759-240-11	TC4011BP
IC809	8-759-240-30	TC4030BP

Diodes

Ref. No.	*Part No.*	*Description*
D1–5	8-719-200-02	10E2
D6–16	8-719-100-02	1S2222
D101–103	8-719-815-55	1S1555

Ref. No.	*Part No.*	*Description*
D105	8-719-100-02	1S2222
D106	8-719-815-55	1S1555
D108	8-719-100-02	1S2222
D109, 110	8-719-815-55	1S1555
D111–113	8-719-200-02	10E2
D114	8-719-100-02	1S2222
D115 D201–212	8-719-815-55	1S1555
D213	8-719-122-10	VD1221 (Serial No: up to 10600)
D401–405	8-719-900-24	SLP24B
D406	8-719-815-55	1S1555
D407	8-719-900-24	SLP24B
D408	8-719-191-07	RD9.1E
D409	8-719-815-55	1S1555
D501–506	8-719-100-02	1S2222
D507–523	8-719-815-55	1S1555
D601, 602	8-712-500-00	1T25
D603, 604	8-719-815-55	1S1555
D701	8-712-500-00	1T25
D702 D801–806	8-719-815-55	1S1555
D807	8-719-200-02	10E2
D808–813	8-719-917-22	SL1172
D814, 815	8-719-815-55	1S1555
⚠D901, 902	8-719-200-02	10E2
D816	8-719-122-10	VD1221 (Serial No: 10601 and later)
D817	8-719-815-55	1S1555 (Serial No: 10601 and later)

CAPACITORS

⚠C433	1-123-324-00	1000 16V elect
⚠C901, 902	1-108-381-00	0.022 Mylar
⚠C903, 904	1-123-325-00	2200 16V elect

RESISTORS

⚠R901	1-246-497-00	10K Carbon
⚠R902	1-202-725-00	3.3M ½W (Canadian model)

MISCELLANEOUS

CF101	1-527-392-00	Ceramic Filter
CF102	1-527-391-00	Ceramic Filter
CF201	1-527-390-00	Ceramic Filter
CF202	1-527-569-00	Ceramic Filter
CF203	1-527-568-00	Ceramic Filter

Ref. No.	*Part No.*	*Description*
CN201	1-507-459-00	Jack, EXT POWER IN DC 12 V
CT601, 602	1-141-229-00	Trimmer
CT701	1-141-171-00	Trimmer
CV501	1-151-369-00	Capacitor, tuning
CV601	1-151-328-00	Capacitor, tuning
CV602	1-151-220-00	Capacitor, tuning
J201–204	1-507-398-00	Jack; MUTE, EXT SP, REC OUT, TIMER
J401	1-507-658-00	Jack; HEADPHONES
L001	1-408-069-00	3.6 µH micro inductor
L002	1-408-068-00	33 µH micro inductor
L003	1-408-070-00	39 µH micro inductor
L004	1-408-347-00	30 µH inductor
L005	1-408-089-00	240 µH micro inductor
L006	1-408-121-00	22 µH micro inductor
L007	1-408-344-00	13 µH inductor
L008	1-408-080-00	100 µH micro inductor
L009	1-408-120-00	18 µH micro inductor
L010	1-408-119-00	15 µH micro inductor
L011	1-408-343-00	11 µH inductor
L012	1-408-078-00	82 µH micro inductor
L013	1-408-119-00	15 µH micro inductor
L014	1-408-113-00	4.7 µH micro inductor
L015	1-408-069-00	36 µH micro inductor
L016	1-408-343-00	11 µH inductor
L017	1-408-114-00	5.6 µH micro inductor
L018	1-408-116-00	8.2 µH micro inductor
L019	1-408-076-00	68 µH micro inductor
L020	1-408-342-00	9.1 µH inductor
L021	1-408-339-00	3.6 µH inductor
L022	1-408-122-00	27 µH micro inductor
L023	1-408-115-00	6.8 µH micro inductor
L024	1-408-340-00	4.3 µH inductor
L025	1-408-114-00	5.6 µH micro inductor
L026	1-408-072-00	47 µH micro inductor
L027	1-408-340-00	4.3 µH inductor
L028	1-408-337-00	2.4 µH inductor
L029	1-408-345-00	20 µH inductor
L030	1-408-339-00	3.6 µH inductor

Ref. No.	*Part No.*	*Description*
L031	1-408-110-00	2.7 μH micro inductor
L032	1-408-338-00	3 μH inductor
L033	1-408-346-00	24 μH inductor
L034	1-408-109-00	2.2 μH micro inductor
L035	1-408-106-00	1.2 μH micro inductor
L036	1-408-117-00	10 μH micro inductor
L037	1-408-108-00	1.8 μH micro inductor
L038, 039	1-408-107-00	1.5 μH micro inductor
L040	1-408-118-00	12 μH micro inductor
L041	1-408-336-00	1.1 μH inductor
L042	1-408-333-00	0.62 μH inductor
L043	1-408-341-00	5.1 μH inductor
L044	1-408-335-00	0.91 μH inductor
L045, 046	1-408-334-00	0.68 μH inductor
L047	1-408-114-00	5.6 μH micro inductor
L048	1-408-333-00	0.62 μH inductor
L049	1-408-330-00	0.3 μH inductor
L050	1-408-337-00	2.4 μH inductor
L051	1-408-332-00	0.47 μH inductor
L052	1-408-331-00	0.33 μH inductor
L101	1-407-210-XX	22 mH micro inductor
L102	1-407-177-XX	470 μH micro inductor
L103	1-407-169-XX	100 μH micro inductor
L104	1-407-210-XX	22 mH micro inductor
L105	1-407-182-XX	2.2 μH micro inductor
L106	1-407-181-XX	1.8 μH micro inductor
L107	1-407-182-XX	2.2 μH micro inductor
L108, 109	1-408-115-00	6.8 μH micro inductor
L110, 111	1-407-169-XX	100 μH micro inductor
L112	1-407-159-XX	15 μH micro inductor
L113	1-407-188-XX	6.8 μH micro inductor
L114	1-407-178-XX	1 μH micro inductor
L201	1-408-096-XX	470 μH micro inductor
L202–205	1-407-177-00	470 μH micro inductor
L401	1-407-856-00	Choke Coil
L402	1-441-855-00	Transformer, heat insulation
L501	1-417-071-00	Coil, alignment
L502	1-401-846-00	Coil, LW antenna

Ref. No.	*Part No.*	*Description*
L503	1-425-796-00	Coil, high frequency transformer (FM)
●L504	1-401-495-11	Loading Antenna Coil
L505	1-407-878-00	27 mH micro inductor
L506	1-407-856-00	Choke Coil
L507	1-408-080-00	100 μH micro inductor
●L508	1-401-495-11	Loading Antenna Coil
L509	1-407-178-XX	1 μH micro inductor
L510 L601	1-407-182-XX	2.2 μH micro inductor
L602	1-405-877-00	Coil, oscillator
L603	1-407-188-XX	6.8 μH micro inductor
L604	1-405-897-00	Coil, oscillator
L605, 606	1-407-169-XX	100 μH micro inductor
L701	1-407-181-XX	1.8 μH micro inductor
L702, 703	1-407-180-XX	1.5 μH micro inductor
L704	1-408-080-00	100 μH micro inductor
L705	1-407-173-XX	220 μH micro inductor
L706	1-407-157-XX	10 μH micro inductor
L707	1-405-722-00	Coil
L708	1-407-169-XX	100 μH micro inductor
L709	1-407-173-XX	220 μH micro inductor
L710, 711	1-407-162-XX	27 μH micro inductor
L712	1-407-188-XX	6.8 μH micro inductor
L713	1-407-162-XX	27 μH micro inductor
L714	1-407-161-XX	22 μH micro inductor
L715	1-407-173-XX	220 μH micro inductor
L716	1-407-856-00	Choke Coil
L717	1-407-178-XX	1 μH micro inductor
L801, 802	1-407-856-00	Choke Coil
L803	1-407-177-XX	470 μH micro inductor
L804	1-407-878-00	27 mH micro inductor
L805	1-408-222-00	27 mH micro inductor
L806	1-407-856-00	Choke Coil
LF401	1-231-660-00	Filter, active
S401	1-553-056-00	Switch, pushbutton; MODE SELECTOR
S402–404	1-514-533-XX	Switch, miniature; DIAL LIGHT, BATT, SEARCH

Ref. No.	*Part No.*	*Description*
S405	1-552-606-00	Switch, slide; POWER
S501	1-552-128-00	Switch, slide; PRESELECTOR
S502	1-552-127-00	Switch, slide; NOISE BLANKER
S503	1-553-055-00	Switch, rotary; ANTENNA SELECTOR
⚠S901	1-552-026-00	Selector, voltage
T101	1-401-816-00	Coil, antenna
T102	1-425-912-00	Coil, balanced mixer
T103	1-404-239-00	Coil, IF
T104	1-404-222-00	Coil, IF
T105	1-404-222-00	Coil, IF (Serial No: up to 10600)
T106, 107	1-405-878-00	Coil, oscillator
T201, 202	1-403-152-00	IFT (AM)
⚠T901	1-446-598-00	Transformer, power (US, AEP, E model)
⚠T901	1-446-991-00	Transformer, power (Canadian model)
TH201, 601	1-800-202-XX	Thermistor (S-10K)
VR201	1-224-550-21	220 Ω-B adjustable
VR202	1-224-254-XX	47 kΩ-B adjustable (Serial No: up to 10600)
VR202	1-224-255-00	100 kΩ-B adjustable (Serial No: 10601 and later)
VR701	1-224-252-XX	10 kΩ-B adjustable
X101	1-527-540-00	Radiator, crystal
X201	1-527-270-00	Crystal Oscillator
X202	1-527-271-00	Crystal Oscillator
X601	1-527-389-00	Crystal, lithium tantalate (Serial No: up to 10920)
X601	1-527-389-12	Crystal, lithium tantalate (Serial No: 11001 and later)
X701	1-527-293-00	Crystal
XF101, 102	1-527-372-00	Filter, crystal
	1-224-600-00	Resistor, variable; 20 kΩ-A, VOLUME
	1-501-220-00	Antenna, telescopic
	1-502-889-00	Speaker
	⚠1-509-510-00	Connector, 2P power (AEP, E model)
	1-509-891-00	Connector, BNC
	1-516-325-00	Switch, miniature
	1-518-413-00	Lamp, pilot
	1-520-416-00	Meter, tuning
	⚠1-561-052-00	Connector, 2 P power (US, Canadian model)

Ref. No.	*Part No.*	*Description*
	COMPLETE CIRCUIT BOARDS	
	●A-3660-241-A	IF/AF
	●A-3680-005-A	VCO
	●A-3680-006-A	VFO
	●A-3680-007-A	RF
	●A-3680-008-A	Filter
	●A-3680-009-A	Preselector
	●A-3680-010-A	Counter
	●A-3681-126-A	Mode (A)
	●A-3681-127-A	Mode (B)
	●A-3681-130-A	Antenna
	●A-3681-131-A	Synthesizer
	PRINTED CIRCUIT BOARDS	
	●1-601-587-12	Headphone
	●1-601-588-12	Miniature Switch
	●1-601-589-12	Photo Detection
	●1-601-591-12	Relay
	●1-601-592-12	Power Switch
	●1-601-596-12	NB-Preselector
	●1-601-602-12	LED
	●1-601-603-12	Power
	●1-603-979-00	Volume

ACCESSORIES & PACKING MATERIALS

Part No.	*Description*
⚠1-534-840-XX	Cord, power (AEP, E model)
⚠1-551-379-00	Cord, power (US, Canadian model)
3-887-817-00	Carton, individual
3-887-818-00	Cushion
3-887-823-00	Spacer (A)
3-887-824-00	Spacer (B)
3-887-828-00	Spacer
3-887-829-00	Sheet, spacer
3-887-830-00	Bag, protection
3-887-831-00	Sheet, caution
3-993-227-01	Tag, caution, carrying handle
3-995-874-04	Manual, instruction

ELECTROLYTIC CAPACITORS

RATING →: Use the high voltage rated one.

CAP. (μF)	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-419-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	–	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	–
3300	1-121-661-00	1-123-075-00	1-123-071-00	–	–	–

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	–	–	–	–
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	–	1-123-028-00
3.3	1-121-995-00	–	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	–	–
47	1-123-251-00	1-121-919-00	–	–
100	1-123-084-00	–	–	–

CERAMIC CAPACITORS

RATING

CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (μF)	50 VOLT.
	PART No.		PART No.		PART No.		PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS

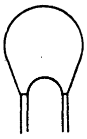
RATING →: Use the high voltage rated one.

CAP. (μF)	25 VOLT.	50 VOLT.	CAP. (μF)	25 VOLT.	50 VOLT.
	PART No.	PART No.		PART No.	PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS

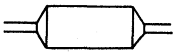
	RATING										
CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.	CAP. (μF)	50 VOLT.	100 VOLT.	200 VOLT.
	PART No.	PART No.	PART No.		PART No.	PART No.	PART No.		PART No.	PART No.	PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				

TANTALUM CAPACITORS



	RATING				→: Use the high voltage rated one.		
CAP. (μF)	3.15 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	25 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	–	–	–	–	1-131-412-00	→	1-131-406-00
0.68	–	–	–	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	–	–	1-131-418-00	–	1-131-413-00	→	1-131-408-00
1.5	–	1-131-421-00	–	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	–	1-131-419-00	–	1-131-414-00	1-131-355-00	1-131-349-00
3.3	–	1-131-422-00	–	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	–	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	–	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	–
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	–			
68	1-131-394-00	1-131-388-00	–	–			
100	1-131-395-00	–	–	–			

TANTALUM CAPACITORS



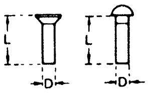
	RATING					
CAP. (μF)	3 VOLT.	6.3 VOLT.	10 VOLT.	16 VOLT.	20 VOLT.	35 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			–	–	1-131-262-00	1-131-278-00
0.33			–	–	1-131-263-00	1-131-279-00
0.47			1-131-169-00	–	1-131-264-00	1-131-280-00
0.68			–	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	–	1-131-266-00	1-131-282-00
1.5		1-131-250-00	–	–	1-131-267-00	1-131-283-00
2.2		–	–	1-131-259-00	1-131-268-00	1-131-284-00
3.3		–	1-131-255-00	–	1-131-269-00	–
4.7		1-131-251-00	1-131-171-00	–	1-131-270-00	–
6.8		–	–	1-131-260-00	1-131-271-00	–
10	–	–	1-131-256-00	–	1-131-272-00	–
15	–	1-131-252-00	–	1-131-261-00		
22	–	–	1-131-257-00	–		
33	1-131-176-00	1-131-253-00	1-131-173-00	–		
47	1-131-288-00	1-131-174-00	–	–		
100	1-131-177-00					

1/4 WATT CARBON RESISTORS

Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*	Ω	*Part No.*
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-576-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-577-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-578-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-579-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-580-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-581-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-582-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-583-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-584-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-585-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-586-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-587-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

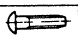
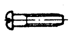
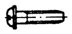
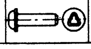
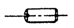
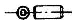
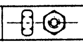
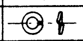
HARDWARE NOMENCLATURE

Screw: — P 3 x 10
L: Length in mm
D: Diameter in mm
Type of head
Indicated slotted-head only.
Unless otherwise indicated, it means
cross-recessed head (Phillips type).



Nut, Washer, Retaining ring:
N 3
Diameter of usable screw or shaft
Reference designation

Reference Designation	**Shape**	**Description**	**Remarks**
		SCREWS	
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	**Shape**	**Description**	**Remarks**
		SELF-TAPPING SCREWS	
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
		SET SCREWS	
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
		NUT	
N		nut	
		WASHERS	
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
		RETAINING RINGS	
E		retaining ring	
G		grip-type retaining ring	

9-950-501-12
(Including 9-950-501-11
9-950-501-82)

Sony Corporation

© 1981

81E05101-1
Printed in Japan

2040

PLL SYNTHESIZED RECEIVER CRF-1

US Model
AEP Model
E Model
Serial No. 16,001 and later

No. 1
January, 1981

SUPPLEMENT

File this supplement with the service manual.

Subject: Production Change

1. CHANGED PARTS

Description	*Former Part No.*	*New Part No.*
Shaft	3-887-706-00	*X-3887-708-0
Printed Circuit Boards		
Miniature Switch	♦1-601-588-00	♦1-601-588-12
Photo Detection	♦1-601-589-00	♦1-601-589-12
Relay	♦1-601-591-00	♦1-601-591-12
Power Switch	♦1-601-592-00	♦1-601-592-12
NB-Pre-selector	♦1-601-596-00	♦1-601-596-12
Headphone	♦1-601-587-00	♦1-601-587-12
LED	♦1-601-602-00	♦1-601-602-12

* Shaft Ass'y: unexchangeable for former shaft

2. ADDITIONAL PARTS

Description	*Part No.*
Printed Circuit Board	
Volume	♦ 1-603-979-00
Semiconductor	
μPB552C	8-759-155-21 (IC802)

Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

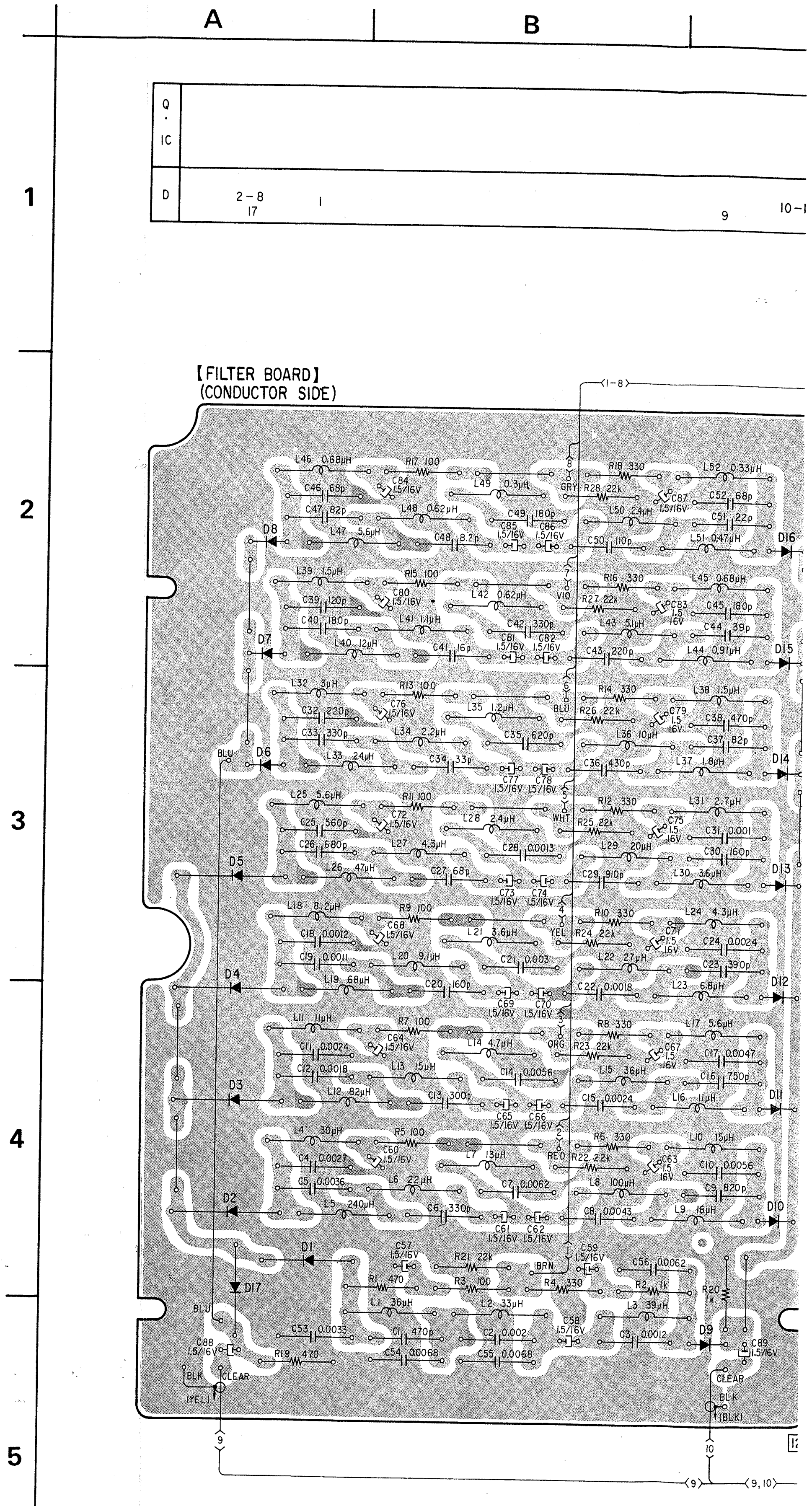
3. Following adjustment is unnecessary because of production changes.

Adjustment for T105 in IF Alignment 1
(page 24, CRF-1 Service Manual)

SONY®
SERVICE MANUAL

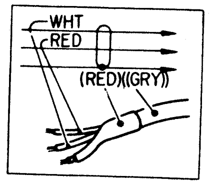
2040

4-1. MOUNTING DIAGRAM

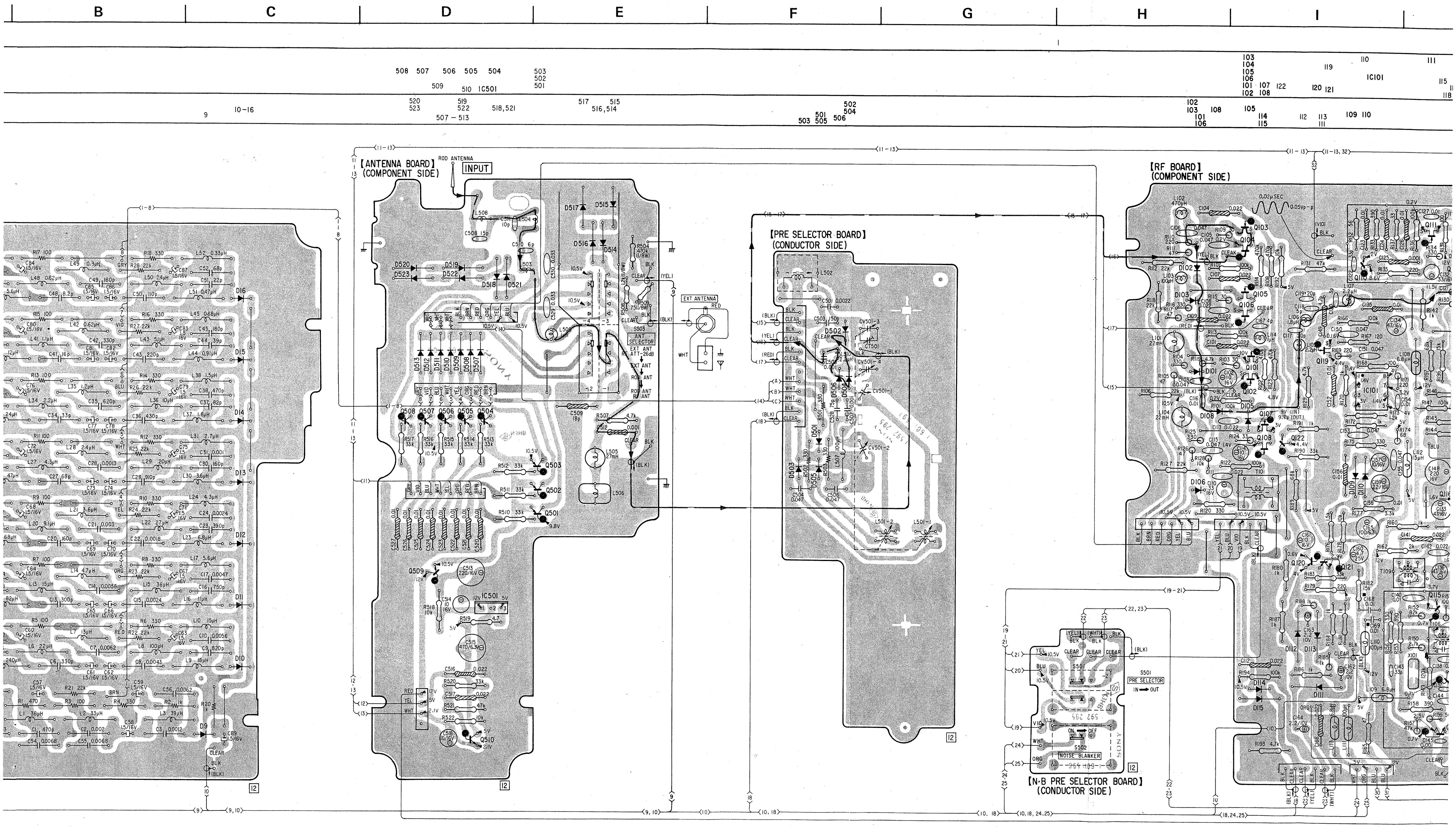


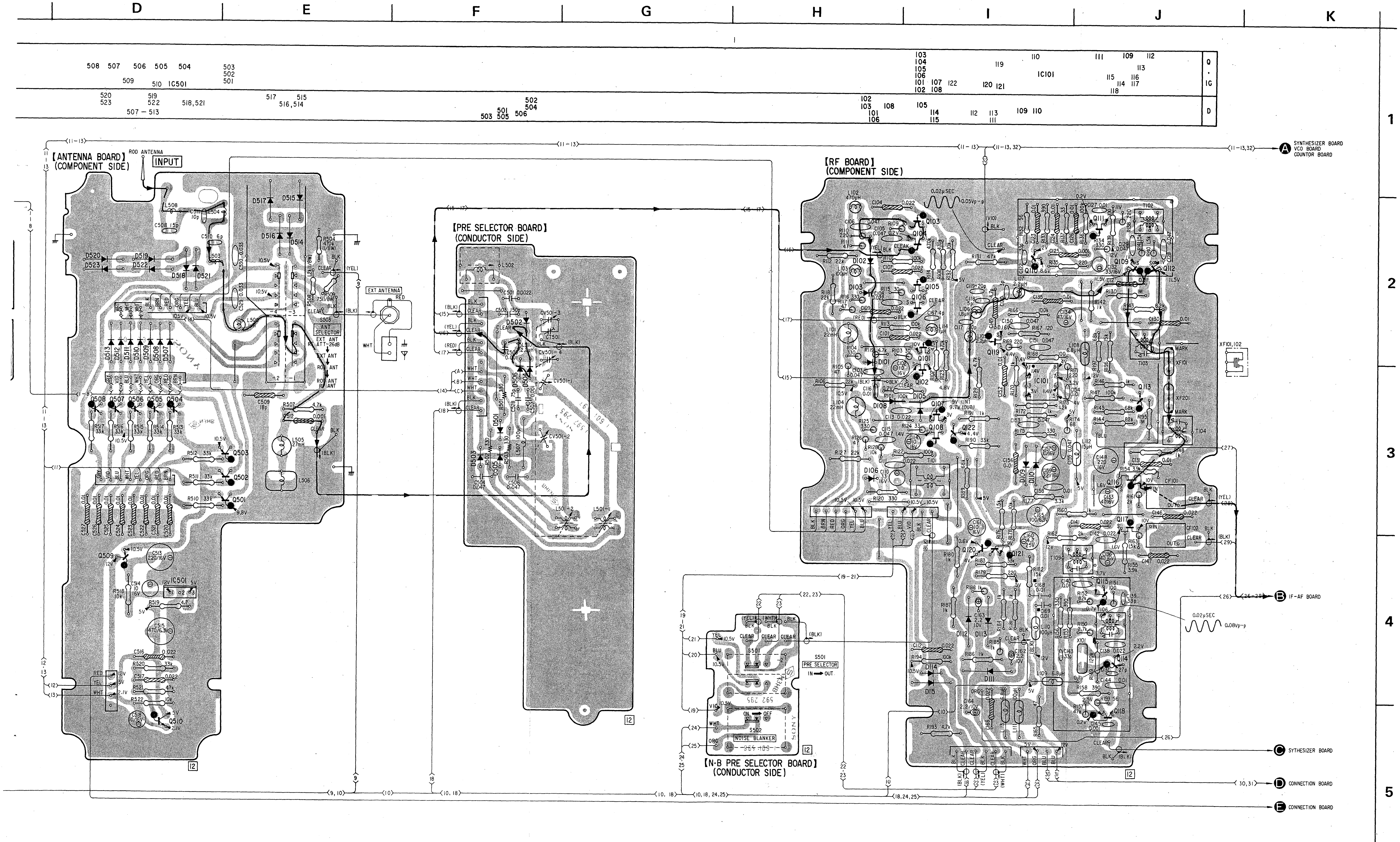
Note:

- Color code of sleeving over the end of the jacket.



- [ ]←: indicates side identified with part number.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ▨ : B + pattern
- ━━▶━━ : signal path

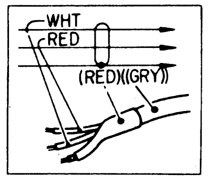

B
C
D
E
F
G
H
I
【ANTENNA BOARD】
(COMPONENT SIDE)
ROD ANTENNA
INPUT
EXT ANTENNA
RED
WHT
ANT SELECTOR
S503
EXT ANT
RF ATT -26dB
ROD ANT
RF ANT
IC501
Q501
Q502
Q503
Q509
Q510
【PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
CV501-1
CV501-2
CV501-3
CV501-4
L501-1
L501-2
【RF BOARD】
(COMPONENT SIDE)
0.02μSEC
0.05Vp-p
IC101
【N·B PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
S501
PRE SELECTOR
IN → OUT
S502
NOISE BLANKER
SONY
BLK
CLEAR
YEL
WHT
ORG
BLU
VIO
BRN
GRY
12


D
E
F
G
H
I
J
K
1
2
3
4
5
Q
IC
D
【ANTENNA BOARD】
(COMPONENT SIDE)
ROD ANTENNA
INPUT
EXT ANTENNA
ANT SELECTOR
EXT ANT
ATT -26dB
ROD ANT
【PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
【N-B PRE SELECTOR BOARD】
(CONDUCTOR SIDE)
S501
PRE SELECTOR
IN → OUT
S502
NOISE BLANKER
ON OFF
【RF BOARD】
(COMPONENT SIDE)
0.02μSEC
0.05Vp-p
0.08Vp-p
XF101,102
Ⓐ SYNTHESIZER BOARD
VCO BOARD
COUNTOR BOARD
Ⓑ IF-AF BOARD
Ⓒ SYTHESIZER BOARD
Ⓓ CONNECTION BOARD
Ⓔ CONNECTION BOARD

4-2. MOUNTING DIAGRAM

Note: (For MOUNTING DIAGRAM)

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

- [-]← : indicates side identified with part number.
- ⊗ : Through hole.
- DC resistance measurements are with coils and transformers connected on the circuit board, and are approximate.
- ▨ : B + pattern
- ━━➔━━ : signal path
- ⊗——⊗ :component-side pattern.

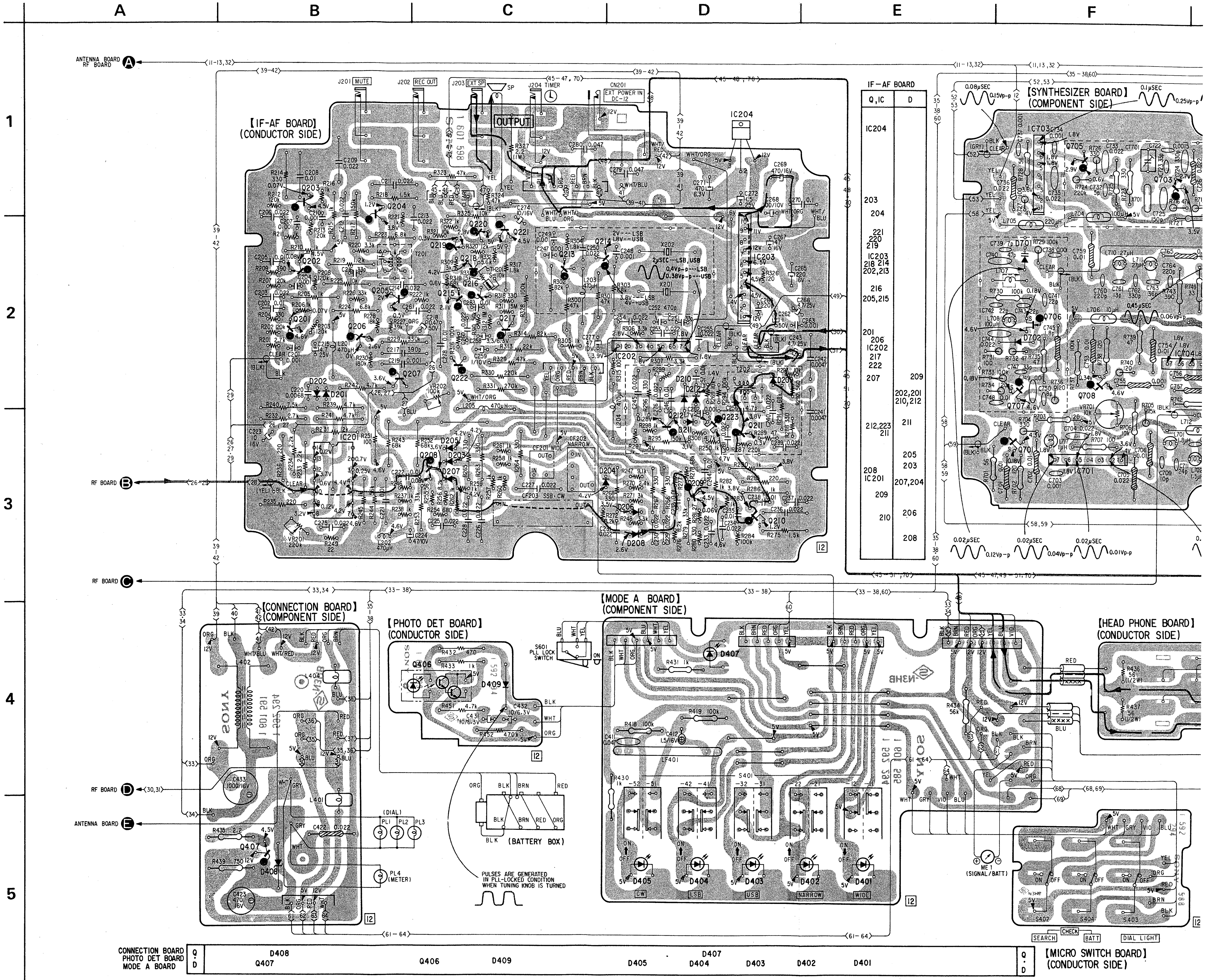
Note: (For SCHEMATIC DIAGRAM)

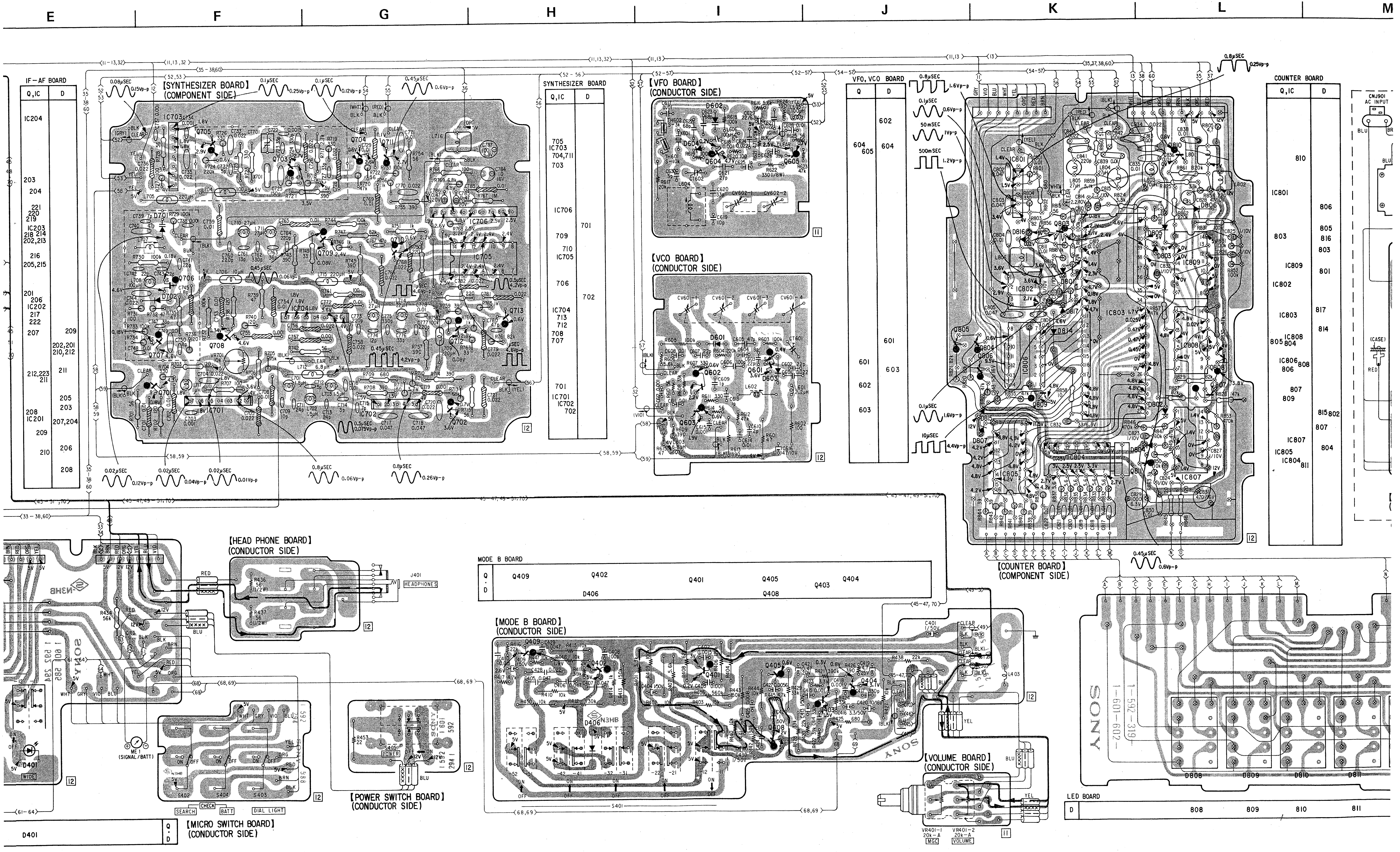
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- △ : internal component.
- ➡ : signal path
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——: B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).

  ( ) : NARROW
  [ ] : SSB. CW
- Voltage variations may be noted due to normal production tolerances.
- Switch

Ref. No.	Switch	Position
S401	MODE	WIDE
S402	SEARCH	OFF
S403	DIAL LIGHT	OFF
S404	BATT METER	METER
S405	POWER	ON
S501	PRE SELECTOR	IN
S502	NOISE BLANKER	ON
S503	ANT SELECTOR	RF ATT –26 dB
S601	PLL LOCK	RELEASED
S901	VOLTAGE SELECTOR	100 V

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.


A
B
C
D
E
F
1
2
3
4
5
ANTENNA BOARD RF BOARD A
RF BOARD B
RF BOARD C
RF BOARD D
ANTENNA BOARD E
【IF-AF BOARD】 (CONDUCTOR SIDE)
IF-AF BOARD
Q,IC
D
【SYNTHESIZER BOARD】 (COMPONENT SIDE)
【CONNECTION BOARD】 (COMPONENT SIDE)
【PHOTO DET BOARD】 (CONDUCTOR SIDE)
【MODE A BOARD】 (COMPONENT SIDE)
【HEAD PHONE BOARD】 (CONDUCTOR SIDE)
【MICRO SWITCH BOARD】 (CONDUCTOR SIDE)
J201 MUTE
J202 REC OUT
J203 EXT SP
J204 TIMER
CN201 EXT POWER IN DC-12
OUTPUT
IC204
S601 PLL LOCK SWITCH
(BATTERY BOX)
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED
(DIAL) PL1 PL2 PL3
PL4 (METER)
ME1 (SIGNAL/BATT)
CW
LSB
USB
NARROW
WIDE
SEARCH
CHECK
BATT
DIAL LIGHT
CONNECTION BOARD
PHOTO DET BOARD
MODE A BOARD
D408
Q407
Q406
D409
D405
D407
D404
D403
D402
D401


E
F
G
H
I
J
K
L
M
[SYNTHESIZER BOARD]
(COMPONENT SIDE)
[VFO BOARD]
(CONDUCTOR SIDE)
[VCO BOARD]
(CONDUCTOR SIDE)
[COUNTER BOARD]
(COMPONENT SIDE)
[HEAD PHONE BOARD]
(CONDUCTOR SIDE)
[MODE B BOARD]
(CONDUCTOR SIDE)
[POWER SWITCH BOARD]
(CONDUCTOR SIDE)
[MICRO SWITCH BOARD]
(CONDUCTOR SIDE)
[VOLUME BOARD]
(CONDUCTOR SIDE)
J401
HEADPHONES
ME1
(SIGNAL/BATT)
SEARCH
CHECK
BATT
DIAL LIGHT
WIDE
POWER
VR401-1
20k-A
MGC
VR401-2
20k-A
VOLUME
CNJ901
AC INPUT
(CASE)
0.08μSEC 0.15Vp-p
0.1μSEC 0.25Vp-p
0.1μSEC 0.12Vp-p
0.45μSEC 0.6Vp-p
0.02μSEC 0.12Vp-p
0.02μSEC 0.04Vp-p
0.02μSEC 0.01Vp-p
0.8μSEC 0.06Vp-p
0.8μSEC 0.26Vp-p
0.8μSEC 1.6Vp-p
0.1μSEC 0.6Vp-p
50mSEC 1Vp-p
500mSEC 1.2Vp-p
0.1μSEC 1.6Vp-p
10μSEC 4.4Vp-p
0.8μSEC 0.25Vp-p
0.45μSEC 0.6Vp-p
SONY
1-592-319-
1-601-602-
D808
D809
D810
D811

IF-AF BOARD

Q,IC	D
IC204	
203	
204	
221	
220	
219	
IC203	
218 214	
202,213	
216	
205,215	
201	
206	
IC202	
217	
222	
207	209
	202,201 210,212
212,223 211	211
	205
	203
208 IC201	207,204
209	
210	206
	208

SYNTHESIZER BOARD

Q,IC	D
705	
IC703	
704,711	
703	
IC706	
	701
709	
710	
IC705	
706	
	702
IC704	
713	
712	
708	
707	
701	
IC701	
IC702	
702	

VFO, VCO BOARD

Q	D
	602
604 605	604
	601
601	603
602	
603	

COUNTER BOARD

Q,IC	D
810	
IC801	
	806
803	805 816
	803
IC809	801
IC802	
	817
IC803	
	814
805 IC808 804	
IC806 808 806	
807	
809	
	815 802
	807
IC807	
IC805	804
IC804 811	

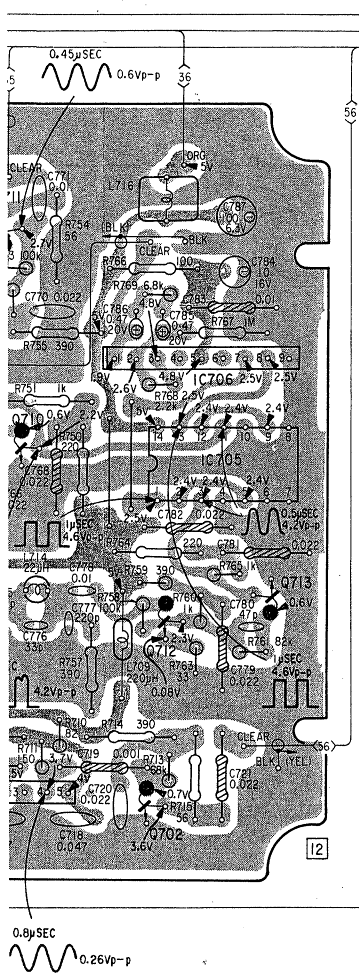
MODE B BOARD

Q	Q409	Q402	Q401	Q405	Q403	Q404	
D		D406		Q408			

LED BOARD

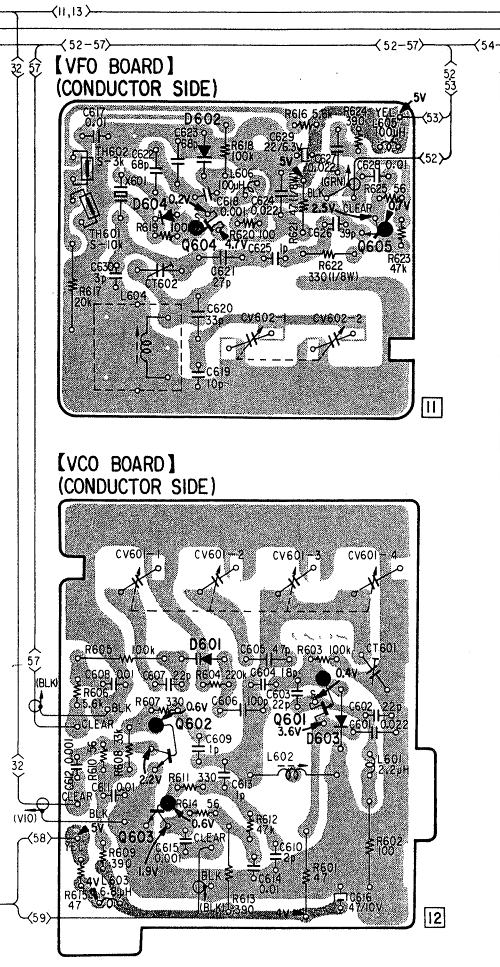
D	808	809	810	811

Q	
D	D401


0.45μSEC
0.6Vp-p
IC706
IC705
0.8μSEC
0.26Vp-p
12

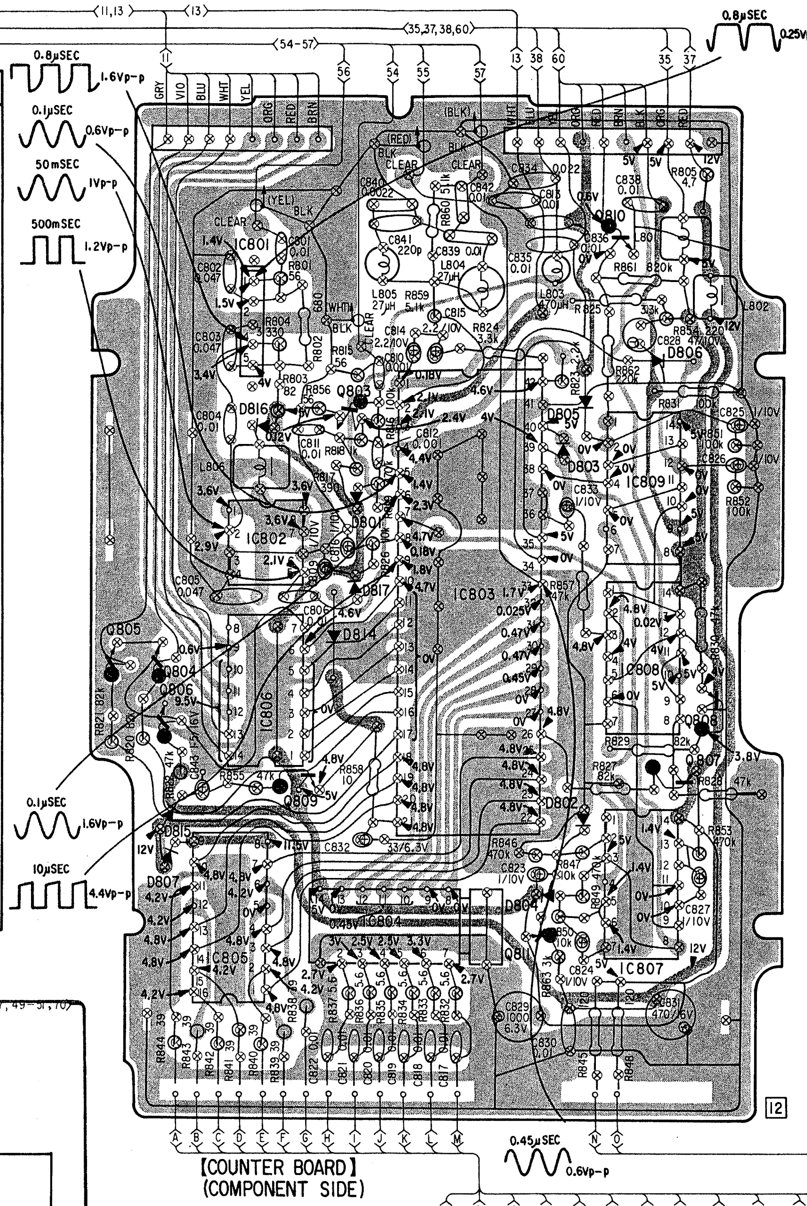
SYNTHESIZER BOARD

Q,IC	D
705	
IC703	
704,711	
703	
IC706	
	701
709	
710	
IC705	
706	
	702
IC704	
713	
712	
708	
707	
701	
IC701	
IC702	
702	


【VFO BOARD】
(CONDUCTOR SIDE)
Q602
Q604
Q605
CV602
CV602-2
11
【VCO BOARD】
(CONDUCTOR SIDE)
CV601
CV601-2
CV601-3
CV601-4
D601
Q601
Q602
D603
Q603
12

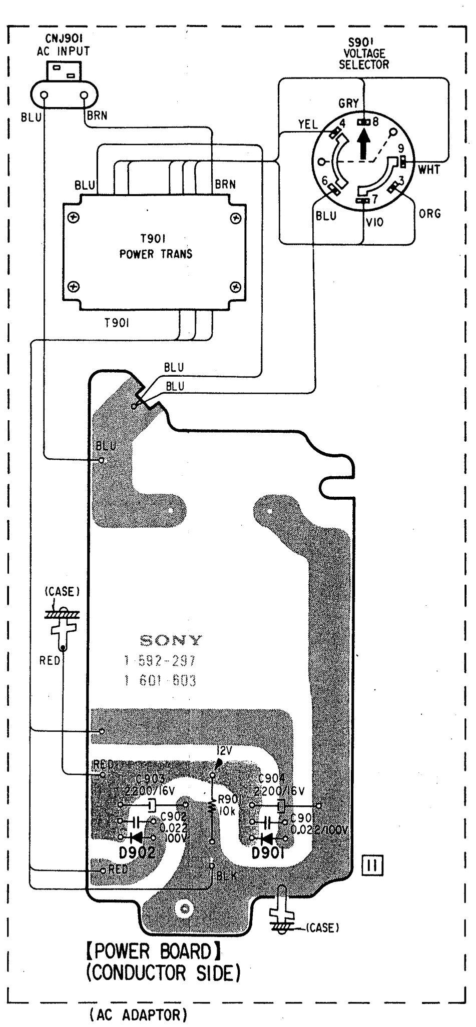
VFO, VCO BOARD

Q	D
	602
604 605	604
	601
601	
	603
602	
603	


0.8μSEC
1.6Vp-p
0.1μSEC
0.6Vp-p
50mSEC
1Vp-p
500mSEC
1.2Vp-p
0.1μSEC
1.6Vp-p
10μSEC
4.4Vp-p
0.8μSEC
0.25Vp-p
IC801
IC802
IC803
IC804
IC805
IC806
IC807
IC808
IC809
12
0.45μSEC
0.6Vp-p
【COUNTER BOARD】
(COMPONENT SIDE)

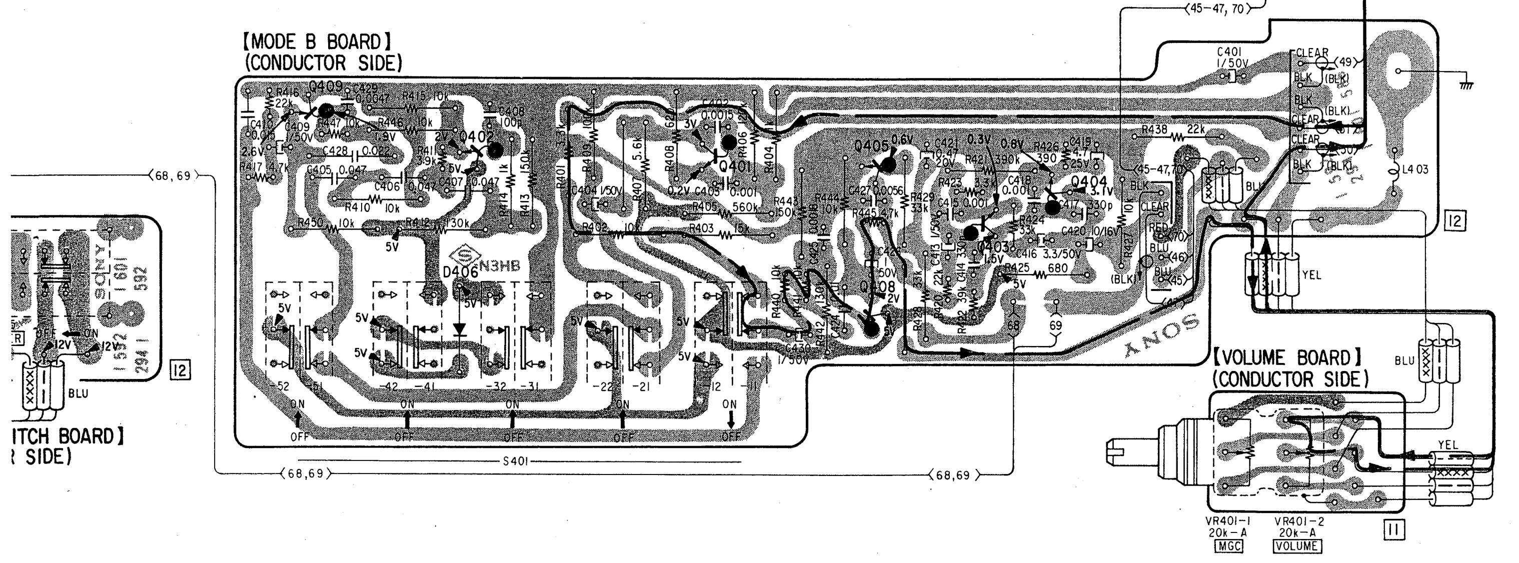
COUNTER BOARD

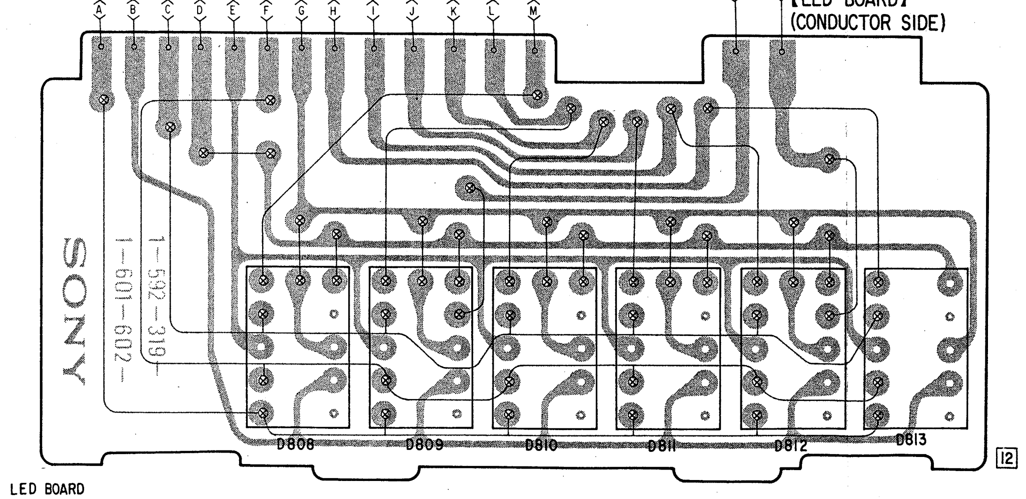
Q,IC	D
810	
IC801	
	806
	805
803	816
	803
IC809	801
IC802	
	817
IC803	
	814
805 IC808 804	
IC806 808 806	
807 809	
	815 802
	807
IC807	
IC805	804
IC804 811	


CNJ901
AC INPUT
S901
VOLTAGE SELECTOR
T901
POWER TRANS
SONY
1 592-297
1 601 603
D902
D901
11
【POWER BOARD】
(CONDUCTOR SIDE)
(AC ADAPTOR)

MODE B BOARD

Q · D	Q409	Q402 D406	Q401	Q405 Q408	Q403	Q404


J401
HEADPHONES
【MODE B BOARD】
(CONDUCTOR SIDE)
Q409
Q402
Q401
Q405
Q403
Q404
D406
S401
12
SONY
【VOLUME BOARD】
(CONDUCTOR SIDE)
VR401-1
20k-A
MGC
VR401-2
20k-A
VOLUME
11
ITCH BOARD】
R SIDE)


【LED BOARD】
(CONDUCTOR SIDE)
SONY
1-592-319-
1-601-602-
D808
D809
D810
D811
D812
D813
12

LED BOARD

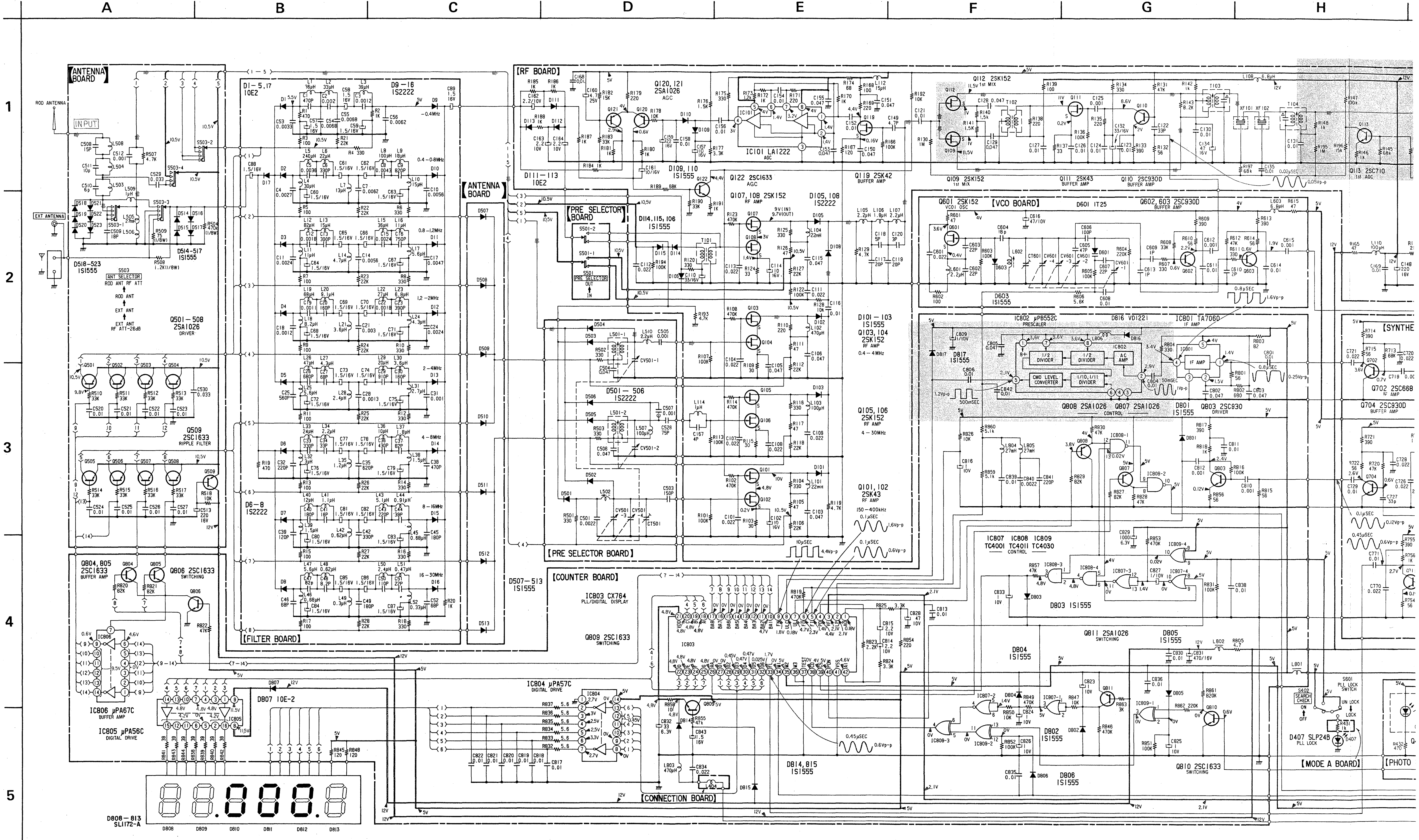
D	808	809	810	811	812	813

4-3. SCHEMATIC DIAGRAM

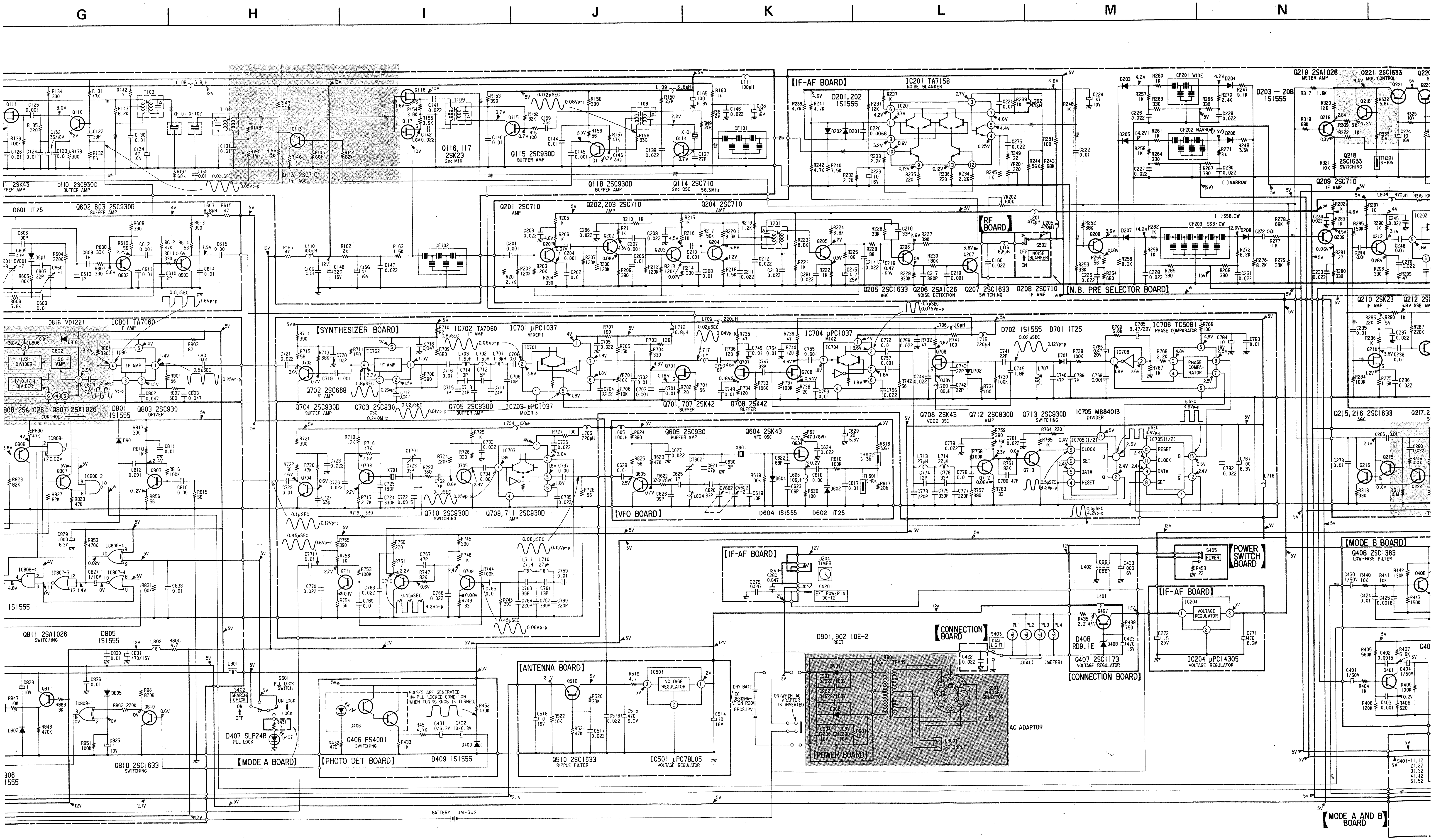
Serial No. 16,001 and later | **CRF-1** **CRF-1** | Serial No. 16,001 and later

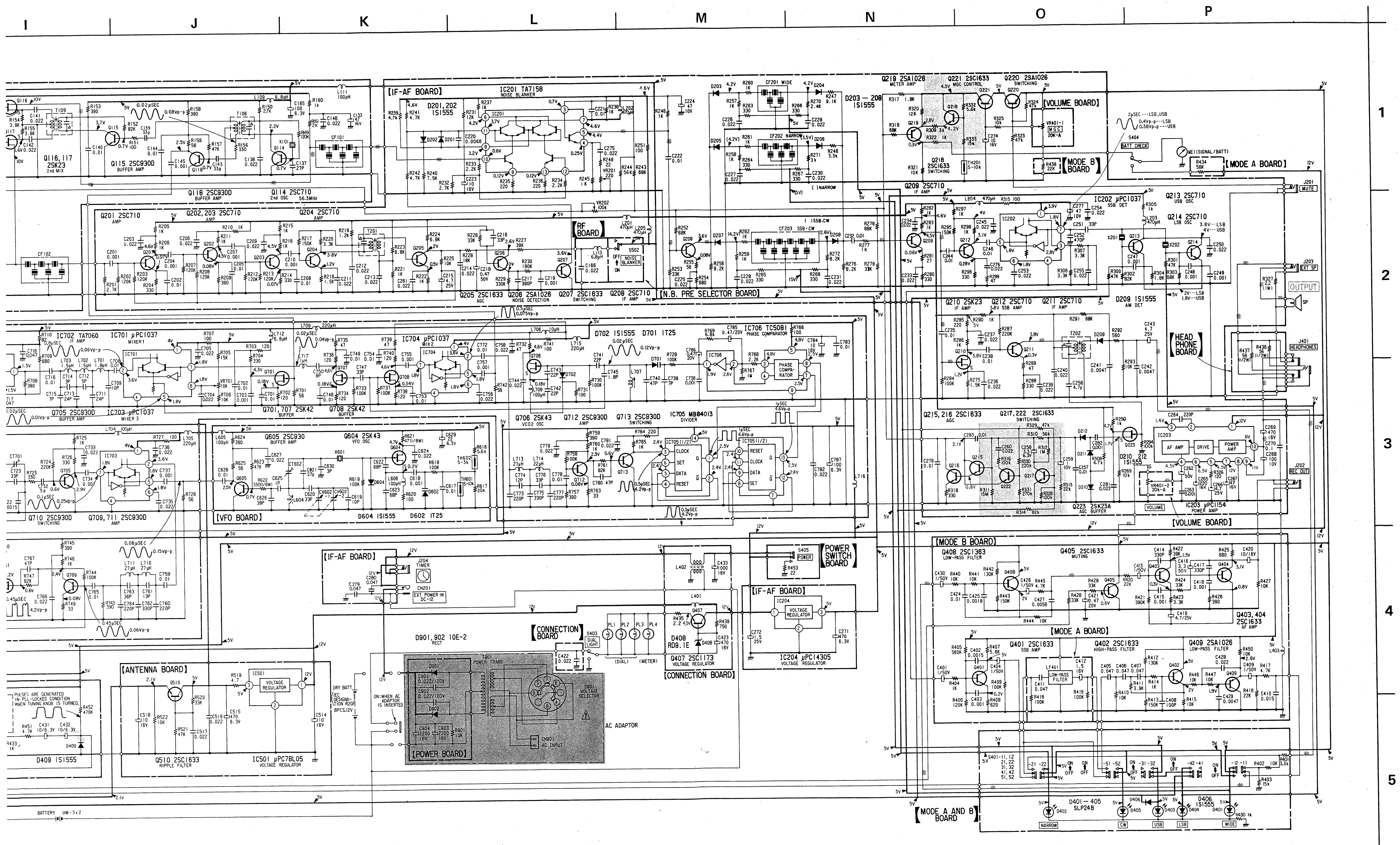
▨ : Changed portion

▨ : Changed portion



A
B
C
D
E
F
G
H
1
2
3
4
5
[ANTENNA BOARD]
ROD ANTENNA
INPUT
EXT ANTENNA
D518–523 1S1555
S503 ANT SELECTOR
ROD ANT RF ATT
ROD ANT
EXT ANT
EXT ANT RF ATT-26dB
D514–517 1S1555
Q501–508 2SA1026 DRIVER
Q509 2SC1633 RIPPLE FILTER
D1–5, 17 10E2
D9–16 1S2222
D6–8 1S2222
[FILTER BOARD]
[ANTENNA BOARD]
D507–513 1S1555
[RF BOARD]
Q120, 121 2SA1026 AGC
IC101 LA1222 AGC
Q119 2SK42 BUFFER AMP
Q122 2SC1633 AGC
Q107, 108 2SK152 RF AMP
D105, 108 1S2222
D111–113 10E2
D109, 110 1S1555
D114, 115, 106 1S1555
[PRE SELECTOR BOARD]
S501 PRE SELECTOR OUT IN
D501–506 1S2222
[PRE SELECTOR BOARD]
D101–103 1S1555
Q103, 104 2SK152 RF AMP 0.4–4MHz
Q105, 106 2SK152 RF AMP 4–30MHz
Q101, 102 2SK43 RF AMP 150–400kHz
Q112 2SK152 1st MIX
Q109 2SK152 1st MIX
Q111 2SK43 BUFFER AMP
Q110 2SC930D BUFFER AMP
Q113 2SC710 1st AGC
Q601 2SK152 VCO1 OSC
[VCO BOARD]
D601 1T25
Q602, 603 2SC930D BUFFER AMP
D603 1S1555
IC802 μPB552C PRESCALER
D816 VD1221
IC801 TA7060 IF AMP
D817 1S1555
1/2 DIVIDER
1/2 DIVIDER
AC AMP
CMO LEVEL CONVERTER
1/10, 1/11 DIVIDER
IF AMP
Q808 2SA1026
Q807 2SA1026 CONTROL
D801 1S1555
Q803 2SC930 DRIVER
IC807 IC808 IC809 TC4001 TC4011 TC4030 CONTROL
[COUNTER BOARD]
IC803 CX764 PLL/DIGITAL DISPLAY
Q809 2SC1633 SWITCHING
D803 1S1555
Q811 2SA1026 SWITCHING
D805 1S1555
D804 1S1555
D802 1S1555
D806 1S1555
Q810 2SC1633 SWITCHING
D814, 815 1S1555
[CONNECTION BOARD]
S402 SEARCH CHECK ON OFF
S601 PLL LOCK SWITCH UN LOCK LOCK
D407 SLP24B PLL LOCK
[MODE A BOARD]
[PHOTO
[SYNTHE
Q702 2SC668 IF AMP
Q704 2SC930D BUFFER AMP
Q804, 805 2SC1633 BUFFER AMP
Q806 2SC1633 SWITCHING
IC806 μPA67C BUFFER AMP
IC805 μPA56C DIGITAL DRIVE
IC804 μPA57C DIGITAL DRIVE
D807 10E-2
D808–813 SL1172-A
D808 D809 D810 D811 D812 D813


G
H
I
J
K
L
M
N
[IF-AF BOARD]
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
Q113 2SC710 1st AGC
Q110 2SC930D BUFFER AMP
Q116, 117 2SK23 2nd MIX
Q115 2SC930D BUFFER AMP
Q118 2SC930D BUFFER AMP
Q114 2SC710 2nd OSC 56.3MHz
Q201 2SC710 AMP
Q202, 203 2SC710 AMP
Q204 2SC710 AMP
[RF BOARD]
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
[N.B. PRE SELECTOR BOARD]
Q602, 603 2SC930D BUFFER AMP
D601 1T25
D816 VD1221
IC801 TA7060 IF AMP
[SYNTHESIZER BOARD]
IC702 TA7060 IF AMP
IC701 μPC1037 MIXER 1
IC704 μPC1037 MIX2
D702 1S1555
D701 1T25
IC706 TC5081 PHASE COMPARATOR
Q702 2SC668 IF AMP
Q704 2SC930D BUFFER AMP
Q703 2SC930 OSC 10.240MHz
Q705 2SC930D BUFFER AMP
IC703 μPC1037 MIXER 3
Q701, 707 2SK42 BUFFER
Q708 2SK42 BUFFER
Q706 2SK43 VCO2 OSC
Q712 2SC930D AMP
Q713 2SC930D SWITCHING
IC705 MB84013 DIVIDER
Q808 2SA1026
Q807 2SA1026 CONTROL
D801 1S1555
Q803 2SC930 DRIVER
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
[VFO BOARD]
D604 1S1555
D602 1T25
Q710 2SC930D SWITCHING
Q709, 711 2SC930D AMP
[IF-AF BOARD]
J204 TIMER
CN201 EXT POWER IN DC-12
[POWER SWITCH BOARD]
[IF-AF BOARD]
IC204 VOLTAGE REGULATOR
IC204 μPC14305 VOLTAGE REGULATOR
[CONNECTION BOARD]
D408 RD9.1E
Q407 2SC1173 VOLTAGE REGULATOR
[CONNECTION BOARD]
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
CN901 AC INPUT
[POWER BOARD]
AC ADAPTOR
DRY BATT. (IEC DESIGNATION R20) 8PCS, 12V
ON: WHEN AC ADAPTOR IS INSERTED
[ANTENNA BOARD]
IC501 VOLTAGE REGULATOR
Q510 2SC1633 RIPPLE FILTER
IC501 μPC78L05 VOLTAGE REGULATOR
[PHOTO DET BOARD]
Q406 PS4001 SWITCHING
D409 1S1555
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
[MODE A BOARD]
S402 SEARCH CHECK
S601 PLL LOCK SWITCH
D407 SLP24B PLL LOCK
Q811 2SA1026 SWITCHING
D805 1S1555
Q810 2SC1633 SWITCHING
BATTERY UM-3×2
Q219 2SA1026 METER AMP
Q221 2SC1633 MGC CONTROL
D203 – 208 1S1555
Q218 2SC1633 SWITCHING
Q209 2SC710 IF AMP
CF201 WIDE
CF202 NARROW
CF203 SSB·CW
Q210 2SK23 IF AMP
Q212 2SC...
Q215, 216 2SC1633 AGC
[MODE B BOARD]
Q408 2SC1363 LOW-PASS FILTER
[MODE A AND B BOARD]


I
J
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O
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1
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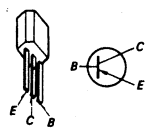
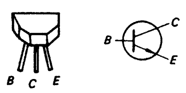
3
4
5
[IF-AF BOARD]
IC201 TA7158 NOISE BLANKER
D201, 202 1S1555
D203 — 208 1S1555
Q219 2SA1026 METER AMP
Q221 2SC1633 MGC CONTROL
Q220 2SA1026 SWITCHING
Q218 2SC1633 SWITCHING
[VOLUME BOARD]
VR401-1 MGC 20K-A
[MODE B BOARD]
S404 BATT CHECK
ME1(SIGNAL/BATT)
[MODE A BOARD]
Q116, 117 2SK23 2nd MIX
Q115 2SC930D BUFFER AMP
Q118 2SC930D BUFFER AMP
Q114 2SC710 2nd OSC 56.3MHz
CF101
CF102
Q201 2SC710 AMP
Q202, 203 2SC710 AMP
Q204 2SC710 AMP
Q205 2SC1633 AGC
Q206 2SA1026 NOISE DETECTION
Q207 2SC1633 SWITCHING
Q208 2SC710 IF AMP
[RF BOARD]
S502 NOISE BLANKER
[N.B. PRE SELECTOR BOARD]
CF201 WIDE
CF202 NARROW
CF203 SSB·CW
Q209 2SC710 IF AMP
IC202 μPC1037 SSB DET
Q213 2SC710 USB OSC
Q214 2SC710 LSB OSC
J201 MUTE
J203 EXT SP
OUTPUT
SP
IC702 TA7060 IF AMP
IC701 μPC1037 MIXER 1
IC704 μPC1037 MIX 2
D702 1S1555
D701 1T25
IC706 TC5081 PHASE COMPARATOR
Q705 2SC930D BUFFER AMP
IC703 μPC1037 MIXER 3
Q701, 707 2SK42 BUFFER
Q708 2SK42 BUFFER
Q210 2SK23 IF AMP
Q212 2SC710 SSB AMP
Q211 2SC710 IF AMP
D209 1S1555 AM DET
[HEAD PHONE BOARD]
J401 HEADPHONES
Q605 2SC930 BUFFER AMP
Q604 2SK43 VFO OSC
[VFO BOARD]
D604 1S1555
D602 1T25
Q706 2SK43 VCO2 OSC
Q712 2SC930D AMP
Q713 2SC930D SWITCHING
IC705 MB84013 DIVIDER
Q215, 216 2SC1633 AGC
Q217, 222 2SC1633 SWITCHING
D210, 212 1S1555
Q223 2SK23A AGC BUFFER
IC203 μPC1154 POWER AMP
AF AMP
DRIVE
POWER AMP
J202 REC OUT
VR401-2 20k-A
[VOLUME BOARD]
Q710 2SC930D SWITCHING
Q709, 711 2SC930D AMP
[IF-AF BOARD]
J204 TIMER
CN201
EXT POWER IN DC-12
S405 POWER
[POWER SWITCH BOARD]
[IF-AF BOARD]
IC204 VOLTAGE REGULATOR
IC204 μPC14305 VOLTAGE REGULATOR
[MODE B BOARD]
Q408 2SC1363 LOW-PASS FILTER
Q405 2SC1633 MUTING
Q403, 404 2SC1633 AF AMP
[MODE A BOARD]
Q401 2SC1633 SSB AMP
Q402 2SC1633 HIGH-PASS FILTER
Q409 2SA1026 LOW-PASS FILTER
LOW-PASS FILTER
[CONNECTION BOARD]
S403 DIAL LIGHT
PL1 PL2 PL3 PL4
(DIAL) (METER)
D408 RD9.1E
Q407 2SC1173 VOLTAGE REGULATOR
[CONNECTION BOARD]
D901, 902 10E-2 RECT
T901 POWER TRANS
S901 VOLTAGE SELECTOR
AC ADAPTOR
CN901 AC INPUT
[POWER BOARD]
DRY BATT (6C DESIGNATION R20) 8PCS,12V
ON: WHEN AC ADAPTOR IS INSERTED
[ANTENNA BOARD]
Q510 2SC1633 RIPPLE FILTER
IC501 μPC78L05 VOLTAGE REGULATOR
PULSES ARE GENERATED IN PLL-LOCKED CONDITION WHEN TUNING KNOB IS TURNED.
D409 1S1555
BATTERY UM-3×2
S401-11, 12 21, 22 31, 32 41, 42 51, 52
D401 — 405 SLP24B
D406 1S1555
NARROW
CW
USB
LSB
WIDE
[MODE A AND B BOARD]

Replacement Semiconductors

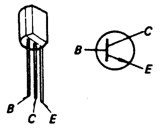
2SA1026



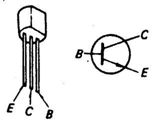
2SC668SP



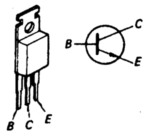
2SC710



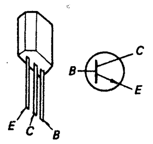
2SC930D
2SC1363



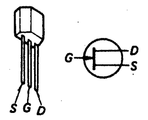
2SC1173



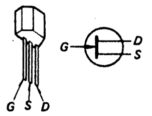
2SC1633



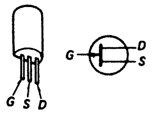
2SK23



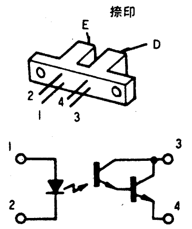
2SK42



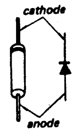
2SK43
2SK152



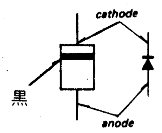
PS4001


捺印
E
D
2
4
1
3
1
3
2
4

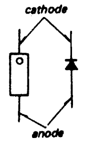
10E2
1S1555
RD9.1E


cathode
anode

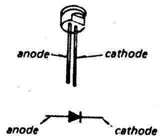
1S222


cathode
黒
anode

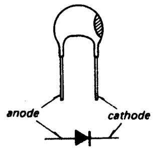
1T25


cathode
anode

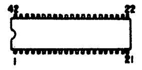
SLP24B


anode
cathode
anode
cathode

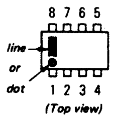
VD1221


anode
cathode

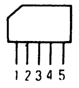
CX764



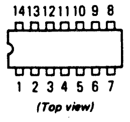
LA1222


8 7 6 5
line
or
dot
1 2 3 4
(Top view)

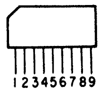
TA7060



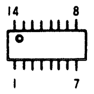
TA7158
TC4001
TC4011
TC4030
µPA67C


14 13 12 11 10 9 8
1 2 3 4 5 6 7
(Top view)

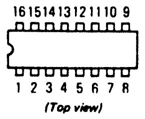
TC5081P



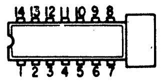
MB84013M



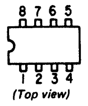
µPA56C


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
(Top view)

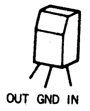
µPA57C


14 13 12 11 10 9 8
1 2 3 4 5 6 7

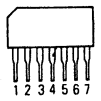
µPB552C


8 7 6 5
1 2 3 4
(Top view)

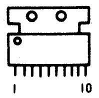
µPC78L05A



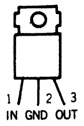
µPC1037



µPC1154



µPC14305


1
2
3
IN GND OUT

14 – 16 leer